Vol. XXIX JUNE 1935 Number 6

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The story of Aqueduct Construction Company's work on Schedule 10 on the Colorado River Aqueduct starts on page 273.

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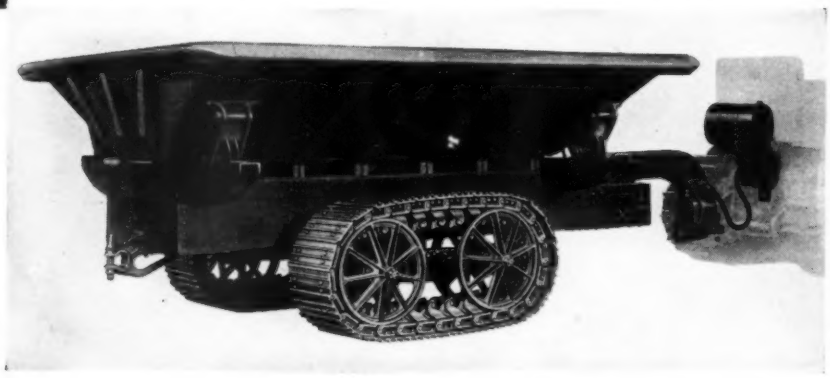

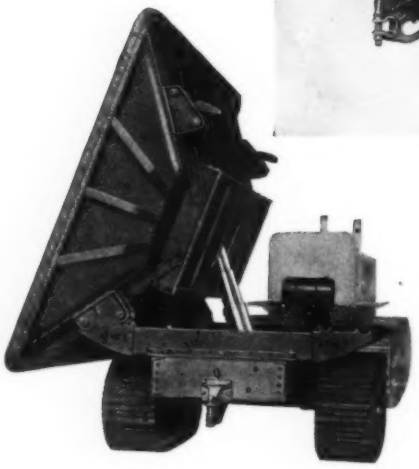

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EXCAVATING ENGINEER

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About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 29 JUNE, 1935 No. 6

Contents

Cutting through the Desert ..... **Front Cover**

Desert sand is piled to one side to make way for the concrete-lined canal which will carry water from the Colorado River to Los Angeles and neighboring cities.

Open Cut on the Aqueduct, by John R. Marcy **273**

Rapid progress is made by Aqueduct Construction Company on their 8-mile section of canal lying between Coxcomb and Iron Mountains. A Bucyrus-Erie 120-B dragline speeds excavation.

Lowers Quarry Floor to Cut Costs, by D. W. Evans **277**

General Crushed Stone Company opens new level at their Glen Mills quarry.

PWA Funds Aid City to Improve Residential District, by E. J. O'Connor **281**

City of Lowell (Mass.) installs extensive sewer project using hand labor to relieve local unemployment.

Field Notes **283**

Field Repairs Quickly Made 283
Handy Device for Attaching Warning Flags 283
Can Opener Used to Cut Sheet Metal 283
Sunstrokes in Excavating 283

Editorials **284**

A Lesson From Another Industry 284
Price or Value? 285

William J. Olcott—Obituary **285**

Equipment You Ought to Know About **286**

New 5-Yard Walking Dragline 286
LeTourneau Rooter 286
Warco Road Hog Grader 286
Wheel-Mounted Concrete Mixer 287
Lincoln Welding Electrode Resists Abrasion 287
Tires Develop Full Traction 287
Trailer Available for ¾-Yard Shovels 287

Shots from the Firing Line **288**

Supreme Court Rules on Parker Dam 288
Draftsmen Exempt from Code Hour Restriction 288
Hackett Appointed Assistant PWA Administrator 288
Revised San Gabriel Plans Disapproved by Authorities 288
Bolivar Dam 288
A Master of the Shovel 288
Heavy Construction and Railroad Code Approved 288
New England Road Builders Hold Annual Meeting 288
Foreign Notes—England 290
Alaska Notes 290
New England Notes 290
Maryland Notes 292
West Virginia Notes 292
Ohio Notes 292
Wisconsin Notes 292
St. Louis and Vicinity 292
River Notes 294
Texas Notes 294
South Dakota Notes 294
Fort Peck Dam Notes 294
Bonneville Dam Notes 296
Grand Coulee Dam Notes 296
California Notes 296
Los Angeles and Vicinity 298
All-American Canal Notes 298
Colorado River Aqueduct Notes 298

Not in the Contract **306**

Trade Notes **307**

Book Reviews **307**

Looking Ahead

These interesting articles will appear in early issues of Excavating Engineer. Watch for them!

Old Spanish Trail Goes Modern.

W. W. Vann & Company, Mercedes, Texas complete 10-mile section of famous trail in quick time.

Open Pit Operations at Flin Flon.

Eight Bucyrus-Armstrong blast-hole drills are used by Hudson Bay Mining and Smelting Co., Ltd., at their Flin-Flon, Manitoba, mine.

One Cut Handles 70-Foot Gravel Bank.

J. P. Burns digs 450,000 yards from high gravel mound for fill on New Jersey road project.

Published Monthly by **THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.**

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

Regular subscription: 25 cents per copy, $1.00 a year; Canada and foreign, $2.00 per year. Special subscription: Upon application on card inserted in this number, this publication will be sent frequently (not regularly) free of charge, to companies, executives and supervisors engaged actively in the industry of excavation.

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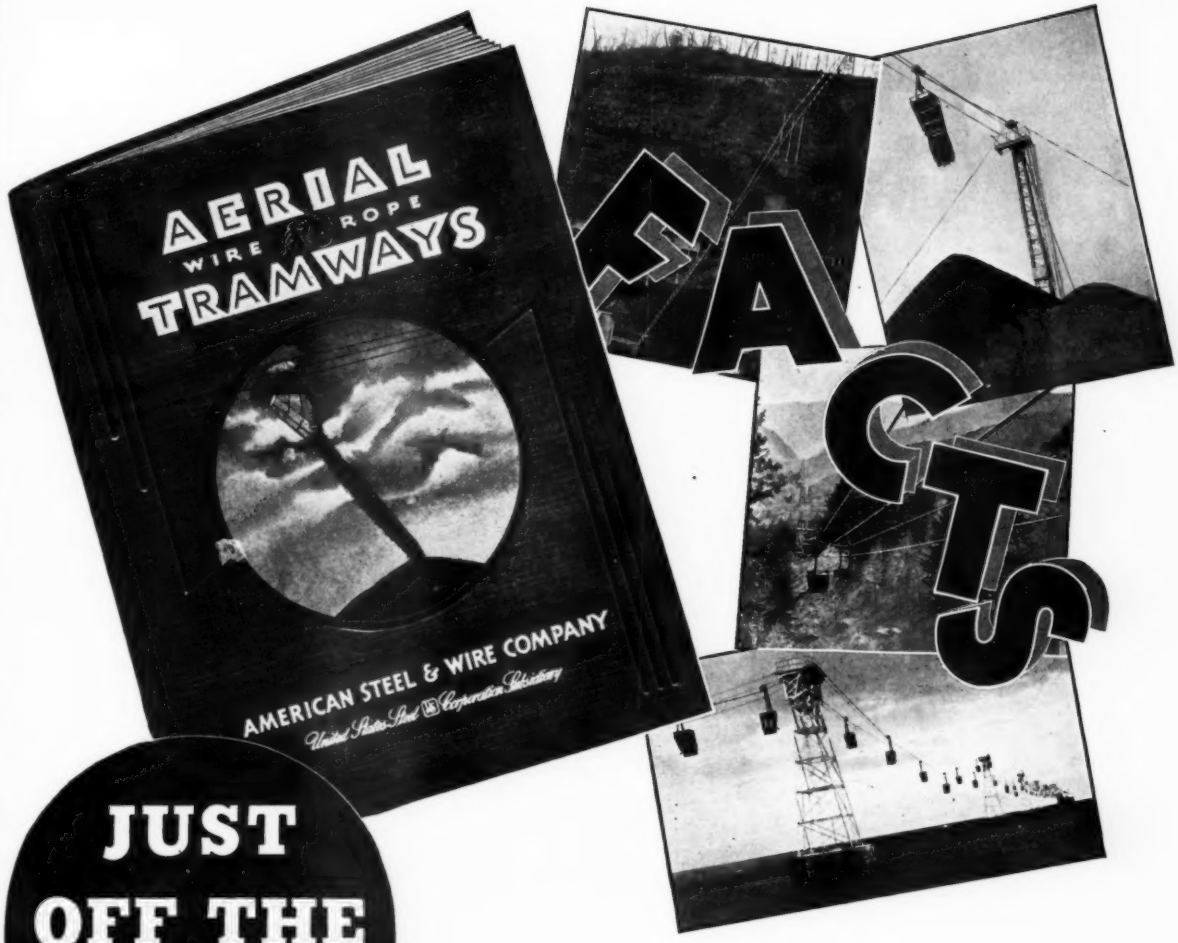

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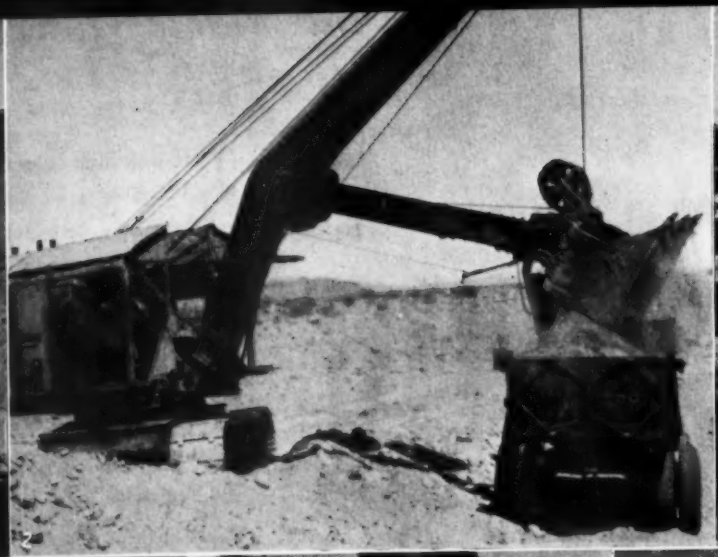


EXCAVATING ENGINEER
FOUNDED 1905

JUNE 1935
VOL. XXIX NO. 6

● *Moving in on the job! The huge dragline, weighing approximately 160 tons was towed from Rice. Four tractors did the trick.*

Open Cut on the Aqueduct

Aqueduct Construction Company makes good progress on canal excavation through desert

By **JOHN R. MARCY**

A DESERT VALLEY, a long winding ditch, a huge electric dragline quietly taking bite after bite, five yards at a time—such is a picture you would see on the Aqueduct Construction Company's work on their section of the 242-mile Colorado River Aqueduct at any hour of the day or night.

Schedule 10, on which this company is now working, lies in the western half of the valley between the Coxcomb and Iron mountains. Aqueduct Construction Company's bid of $3,461,543 included four open-work schedules, Nos. 1, 10, 11, and 13. The excavation will soon be completed on No. 10, the first one started. They are now working at the end near Coxcomb tunnel, the rest of the schedule having been finished to rough grade.

The Aqueduct Construction Company is made up of W. H. Hanrahan, President; Charles Harlowe, Jr., Vice-President in charge of excavation, both of San Francisco; R. S. Seabrook of Glendale; C. M. Elliot of Pasadena; and the Youdall Construction Company of San Francisco. Superintendent Matt Hongola is in charge of concreting and Superintendent W. Ward in charge of excavating. A. G. Wright is the head of the Imperial Rock Corporation, sub-contractors who furnish gravel and sand for the big project. Spicer, Robinson, and West are sub-contractors on part of the rough excavation and for all of the finish grading. Holmes Supply Company furnishes the boarding facilities and runs the camp.

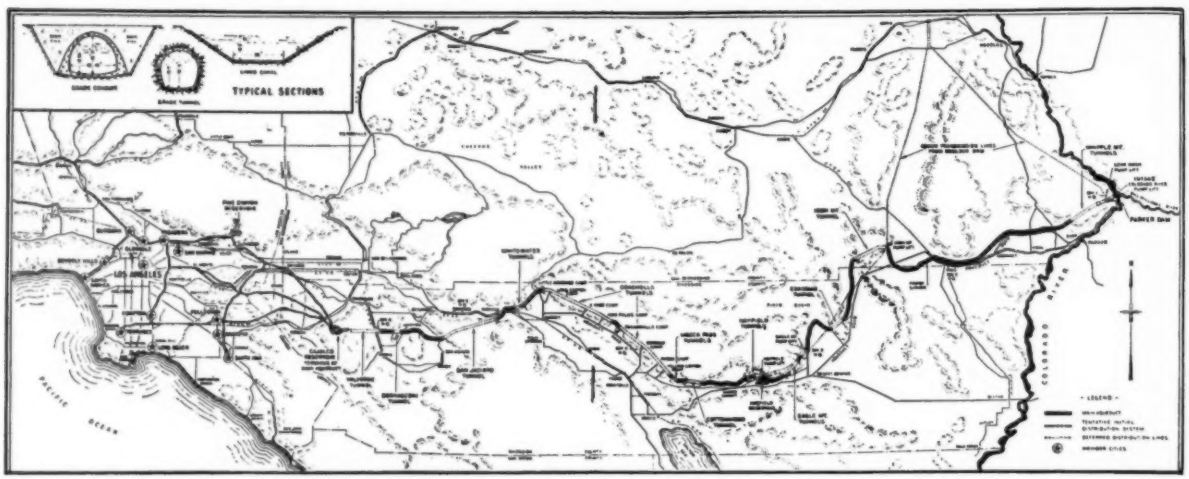
Frontispiece

● *1. The big ditch—ready for the finish grading and concreting. Coxcomb Mountain lies in the background. 2. The Bucyrus-Erie 50-B Diesel loads a 5-yard Sterling in the gravel pit. 3. The batching plant operator keeps an eye on the automatic scales which control the flow of aggregates. 4. The 5-yard Bucyrus-Erie Type-Y bucket dumps on the spoil bank. 5. Conveniently placed controls and a comfortable seat help the 120-B dragline operator maintain high output. 6. 4500 yards in 8 hours! 7. Spicer, Robinson, and West, subcontractors, use a 3-yard Link Belt working behind a 2-yard machine of the same make, visible in the background. 8. One of the four 1-yard Rex mixers used for lining receives a little lubrication. An International 10-ton truck is ready to discharge its load. 9. This portable substation connects dragline to 33,000-volt transmission line.*

Schedule No. 10 consists practically of all open canal, with 11 siphons to make things interesting. Siphons are to be of the three-barrel box type, with the exception of a section of circular monolithic concrete pipe, 12 feet 9 inches in diameter and 1,140 feet long, near the center.

5-Yard Dragline Obtains Good Output

Aqueduct Construction Company began operations on schedule 10 January 23 when they started canal excavation with a Bucyrus-Erie 120-B electric dragline, purchased for this job. The dragline, powered by General Electric motors with Ward-Leonard control, carries a Bucyrus-Erie Type Y 5-yard bucket on a 70-foot boom. Up to the last of March this machine has excavated approximately 5 miles of the 8-mile section of ditch, which averages 20 feet wide at the bot-



tom, 50 feet wide at the top, slope 1½ to 1, and with a depth of from 12 to 25 feet. The Bucyrus-Erie, as this is written early in April, is making a cut 12 feet 4 inches deep, but will get into deeper work almost immediately. A 20-foot section has been added to extend the boom to 90 feet in preparation for the additional reach required on the larger cross section.

C. L. Boyer, dragline runner, says that the three shifts of 8 hours each have been turning out in the neighborhood of 10,000 to 12,000 loose cubic yards per day, with several shifts showing 4500 yards in 8 hours—an average of almost 10 yards per minute. He adds that the dragline is one of the best "dirt-movers" he has ever run. Vice-President Charles Harlowe, on the other hand, says that dragline runners are always haywire on figuring output — that they are good for news, but not for accuracy. He declines, however, to contradict the figures. However, a fact that does not bear contesting is that 5 miles of the big ditch were excavated in the 9½ weeks between January 23 and March 31 by the fast digging 120-B.

Subcontractors Spicer, Robinson, and West of Los Angeles have completed excavation on about 1½ miles of their part of schedule 10 in 6 weeks, using two gasoline-powered Link Belts and one 1¾-yard Koehring dragline. One of the Link Belts, a model K-44 2-yard dragline, makes the first cut, excavating to a depth of

● *Colorado River water will be carried through this 242-mile Aqueduct to Cajalco Reservoir for distribution to the thirteen member cities of the District. The initial project will cost $220,000,000.*

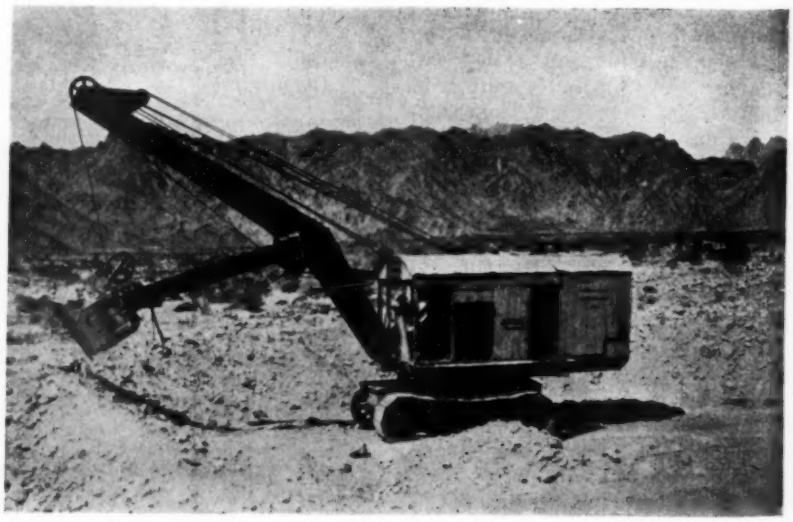
● *Left to right: R. S. Seabrook, Matt Hongola, A. G. Wright, and C. M. Elliot.*

● *This 12-year old Bucyrus-Erie 50-B Diesel digs lots of gravel in an 8-hour shift.*

10 feet and about half the width of the ditch. This machine is followed by the K-55 3-yard dragline which completes the canal to rough grade. Spicer, Robinson, and West will also do the finish grading on schedule 10, and all the excavating on schedules 11 and 13, while the Aqueduct Construction Company will do all the work on schedule 1, 70 miles east, near Whipple mountain. The latter company will move their Bucyrus-Erie dragline over to that job when No. 10 is completed.

Special Trimming Blade Used on Slopes

Bottom finishing is done in the canal section by a Caterpillar 60 equipped with a large, fine-grade drag which pushes the surplus material along to where the draglines can pick it up. Finish grade



on the slopes is handled by the Koehring 1¾-yard gas dragline, using a special trimming blade designed by Mr. Robinson. In appearance, this is like a back-filling blade. The edges are so constructed that they ride on screeds set at 12-foot intervals, and the blade cuts only to the exact depth wanted. Joe Paye, is in charge of the work for Spicer, Robinson, and West. Laborers clean up behind the blade, and set the screeds ahead of it. A Caterpillar 60 with an Ateco bulldozer then collects the surplus on the bottom and piles it, to be later hoisted out of the ditch by one of the draglines.

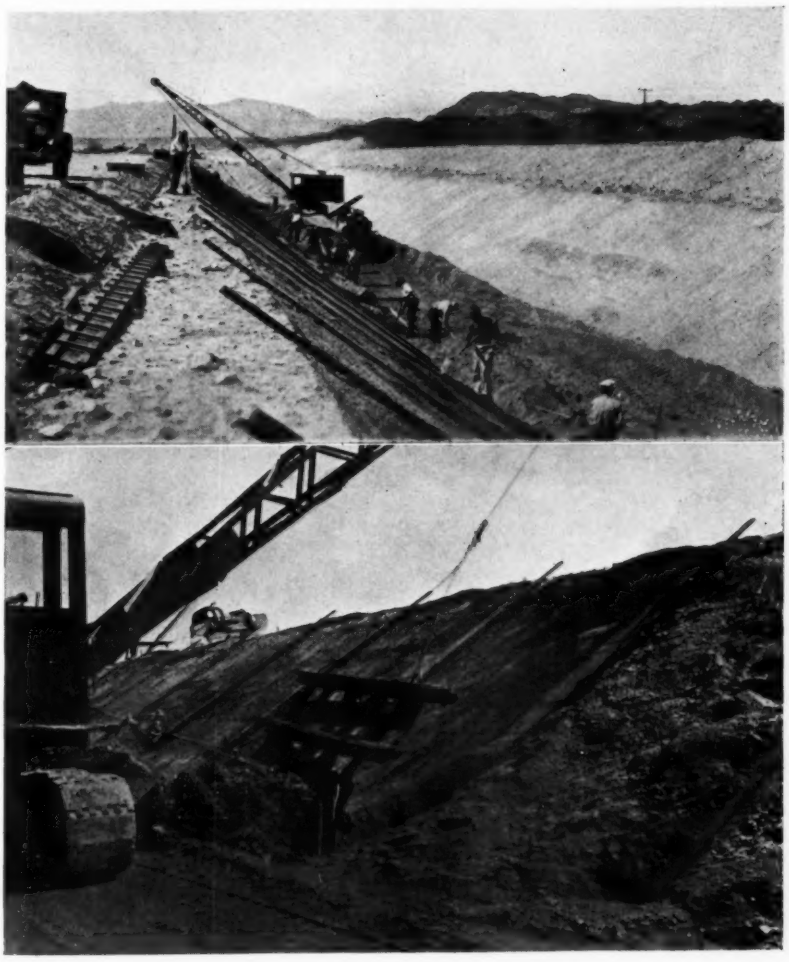
Construction roads are also being built by bulldozers, using both Cletrac 80's and Caterpillar 60's and pulling Western Wheel scrapers. One bulldozer on a Caterpillar 60 tractor, of particular interest, was a more or less homemade one that uses a Model A Ford rear end for the power take-off, with which to control the bulldozer blade.

Bucyrus-Erie Diesel Digs Gravel

At the gravel pit, 1½ miles west of the center of schedule 10,

● *Joe Paye, foreman for Spicer, Robinson, and West, sees to it that a good job of finish grading is done.*

from which the Imperial Rock Corporation is taking its sand and gravel, an old timer is working. It is a Bucyrus-Erie 50-B Diesel shovel of some 12 years vintage. This shovel loads to 5-yard Sterling trucks which haul the sand and gravel to the batching plant. J. E. Ashinhurst has been the runner for about a year (the shovel works only one shift of 8 hours) and is enthusiastic, to say

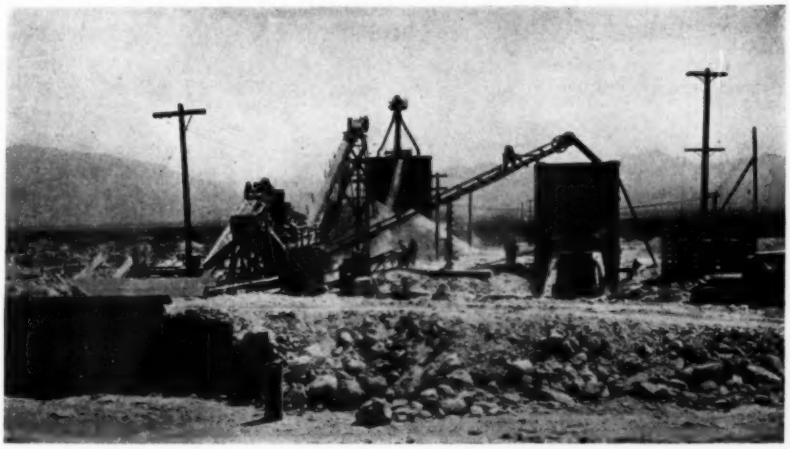


● *Top: Finish grading on the canal slopes is speeded up by the use of guides and a special trimming blade. Below: The blade rides on the screeds and pulls the excess to the bottom of the ditch.*

● *Imperial Rock Corporation have a fully equipped crushing and screening plant for getting out the aggregates.*

the least, about the way the shovel performs. He says, "It is absolutely the finest --- -- - ----- of a shovel on earth. I love this old baby . . . she's a honey to work on. I'm going to stick with her until she's scrapped."

All rocks over 15 inches in diameter must be thrown out be-



● *Five miles of the big ditch were dug in 9½ weeks!*

cause the crusher at the plant will handle only up to that size. At least 50% of the pit's output is waste sand, not needed in present concrete proportions. This extra material is stock-piled.

Batching Plant Fully Automatic

After the material from the pits has gone through the grizzly and over the screens, it reaches a very modern batching plant, built by the Bodinson Manufacturing Company of San Francisco, equipped with hoppers and fully automatic scales. This part of the equipment was installed by the Aqueduct Construction Company. There are 5 hoppers, one for 2½-inch rock, one for 1¼, and one each for pea gravel, cement, and sand. Each hopper has an electric scale connected to it, and the flow is controlled by two photo-electric beams, 10 in all. These beams are made up of an infra-red ray projector and a photo-electric cell. The first one cuts the big flow to a minimum as the desired weight is neared, and when the exact amount is reached, No. 2 circuit cuts it off completely. At this batching plant, as R. S. Seabrook puts it, you "push a button and everything starts working." After weighing, the 2½ and 1¼-inch rock, pea gravel, and cement are dumped together into a truck and capped by the sand.

Canal Lined with Concrete

Eight International 10-ton trucks haul the batches over to four 1-yard Rex mixers at work pouring the concrete floor of the ditch and box siphons. The mixers discharge to a 1¼-yard concrete bucket which is swung to the bottom of the canal by a Link Belt K-1 crane. This same rig, carrying a 60-foot boom, is also used for setting steel for the siphons. A Lakewood finisher is used on the bottom, and according to Matt Hongola, Concrete Superintendent, it does a nice job. It is powered by an 8 h.p. 2-cylinder gas engine, and the finishing equipment consists of 2 screeds with a tamper in between.

● *The rear end of a Model-A Ford, mounted on one of the Caterpillar 60's, controls the bulldozer.*

● *Good roads are necessary on a job of this length. A Caterpillar 60 pulls an Austin-Western road grader.*

When the Aqueduct Construction Company, later on, comes to placing concrete on the 1½ to 1 slopes of the open canal, the automatic equipment they have installed will show its real value. A close control of the ingredients going into the mix is required by

(Continued on page 302)

● *In tough digging every day! The 3-yard shovel loads to 7½-ton Mack trucks, and sets aside the oversize without delay.*

Lowers Quarry Floor to Cut Costs

General Crushed Stone Company, at Glen Mills, Penn., starts new quarry level 40 feet down to eliminate stripping costs and reduce hauling distance from shovels to crusher

By D. W. EVANS

THE MAN has to bite the dog before it becomes news. We will have to wait until we find a quarry superintendent who boasts of rock easy to shoot and handle before we can make the front pages for the crushed stone industry.

E. E. Dotter, Superintendent of the Glen Mills (Pennsylvania), quarry owned by General Crushed Stone Company, Easton, Pennsylvania, is much more interested in reducing rock costs and accident rates than in making front page news. He admits that this "bastard traprock" is mean stuff to drill; that it doesn't break well; needs lots of secondary shooting; is tough stuff to dig; wrecks truck bodies; ruins crusher jaws; wears out screens too darned fast! All that is just in the day's work. To make these days really interesting he is going ahead right now lowering the quarry floor 40 feet, a little change which has slowed up production temporarily, besides making it necessary for him to import extra trucks and blast-hole drills and install an additional quarry shovel.

● *The peculiar rock formation at Glen Mills is hard to drill and shoot in such a way as to produce good fragmentation. Heavily seamed, the strata lie at a 65° angle from the horizontal.*

Plant Strategically Located

The Glen Mills quarry is located 20 miles due west of Philadelphia. Of the ten quarries operated by the General Crushed Stone Company, probably this one can reach the widest market. Limited by freight rates to a radius of about 60 miles for ship-

● *A series of 50 to 60 blockhole shots break up most of the oversize of a recent blast. The old "standard" shovel to the left was replaced in 1931 by a modern 3-yard full revolving quarry shovel.*

ments, this quarry has placed stone on highway jobs in New Jersey, Delaware, and Maryland, and throughout Eastern Pennsylvania. In addition, it furnished ballast to the Pennsylvania Railroad on the recently completed electrification project extending from New York City to Washington, D. C.

But to get back to the quarry and Superintendent Dotter . . . this quarry has been operated, he says, for at least 40 years and has been worked by General Crushed Stone for 29 years. East of the present quarry face is a fairly substantial tree-covered ridge a hundred yards long, which is composed partially of screenings that came from the plant back in the years when such stuff had no market. The present quarry face forms an almost complete circle 1200 feet in diameter, open on the side toward the Pennsylvania railroad tracks, along which are strung out the shops and the crushing plant itself.

Two Modern Quarry Shovels Handle Rock

On the far side of the quarry floor a 7½-ton Mack truck swings under the waiting dipper of a 3-yard 100-B Bucyrus-Erie electric shovel, working against the 110-foot quarry face. To the west, outlined against the sky, a blast-hole drill clanks away at its endless task of making holes for dynamite to rip out rock to feed the shovel. Nearer the crusher, three more drills and a 2½-yard 75-B Bucyrus-Erie electric shovel are busy in a newly opened pit which soon will be the new quarry floor. Another Mack truck labors steadily up the ramp from this second shovel to the main quarry floor and thence to the bridge over the noisy, crunching jaws of the 42″ x 48″ Traylor primary crusher.

A description of quarry operations must necessarily be divided between the present level, where operations have for years been somewhat standardized, and the new level, where method and work are changing from day to day.

● *One of the Mack trucks dumps its load of rock into the maw of the Traylor primary crusher.*

Mean Rock Formation Exists

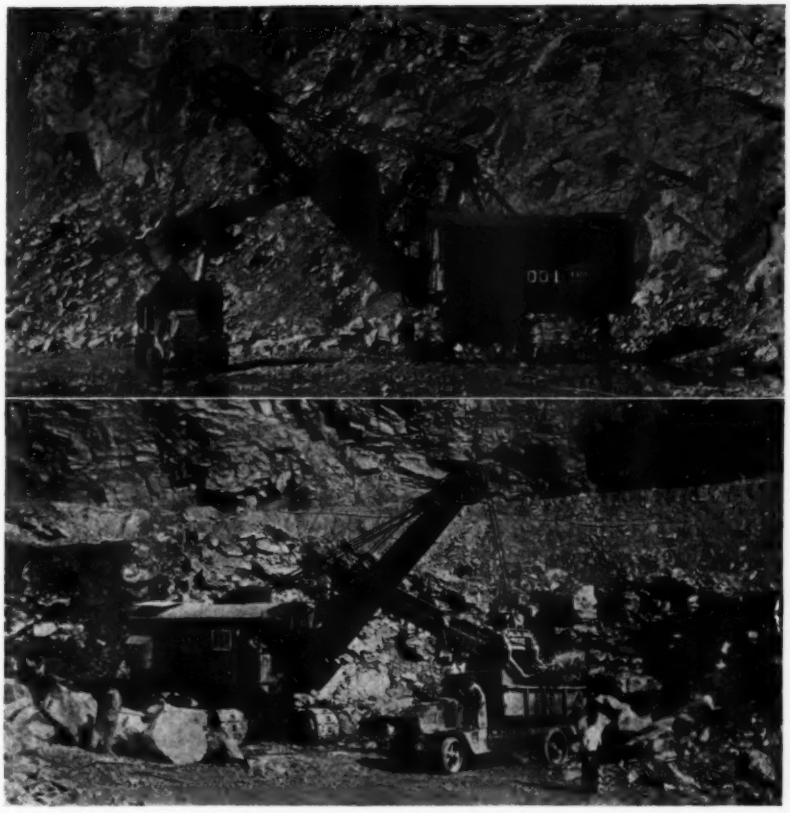
The upper quarry face is drilled by a 6″ Sanderson blast-hole machine, and shot by relatively small charges of dynamite. A blast brings down an average of 10,000 tons of stone. The nature of material encountered here accounts entirely for the difficulties in rock handling and the shooting methods employed.

This rock, while of finest quality, is heavily seamed and lies at an angle of 65° from the horizontal. It thus defies all ordinary methods of producing well broken rock. Blast holes are generally spaced 20 feet apart and 25 feet back from the toe. Best results have been obtained by loading the entire charge of 50% quarry gelatin as close as possible to the foot of the blast holes. Due to the heavy seams it is next to im-

● *The GA-2 shovel, operated by Mike Ahern, has just completed a neat job here of grading and sloping in preparing a place for additional stockpiles.*

possible to spring the drill holes successfully. Where previous blasts resulted in too great a depth of rock in front of the charge at the toe, the blast holes are supplemented by nearly horizontal 2-inch holes put into the toe by drifter drills on tripods. While a good tonnage of rock is brought down by these blasts, a large amount of secondary drilling and shooting is necessary before the shovel wades into the pile. As a safety measure, there is no mud capping permitted on secondary work. All oversize is drilled by jackhammers. The holes are loaded and fused for firing after the day's rock loading is over. Harry McGurk, quarry foreman, who has charge of all drilling and shooting, points out that the method used on secondary shooting is not only the safest but far more economical. With this rock formation particularly expensive to reduce to crusher size, every possible saving must be made.

The 100-B 3-yard, full-revolving quarry shovel which gnaws away at the foot of the cliff was put to work here in 1931, replacing a railroad-type shovel now reposing peacefully on another section of the quarry floor. This modern machine has been operated by Carl Kinney for the past two years, and has given an excellent account of itself both in output and in low upkeep cost.



● *Top: Operator Walker, at the levers of the 100-B shovel, loads another Mack truck with 7½ tons or more of traprock. Below: The 75-B, operated by Carl Kinney, digs a few more tons of rock out of the newly opened pit. To the left of the shovel may be seen one of the jackhammer crew of five men drilling blockholes in a chunk of oversize.*

● *Oversize from the primary crusher is carried up by this bucket elevator, and drops through the secondary reduction crushers before being elevated again to the screening plant.*

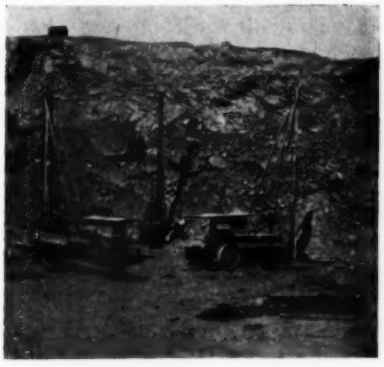
The 75-B 2½-yard quarry shovel, on the difficult work of opening up the new level, was shipped in August, 1934, and went to work in October in the charge of Operator I. B. Walker. At the time of our visit the two operators had swapped shovels, as Kinney's longer experience in rock digging was needed to speed up the new development.

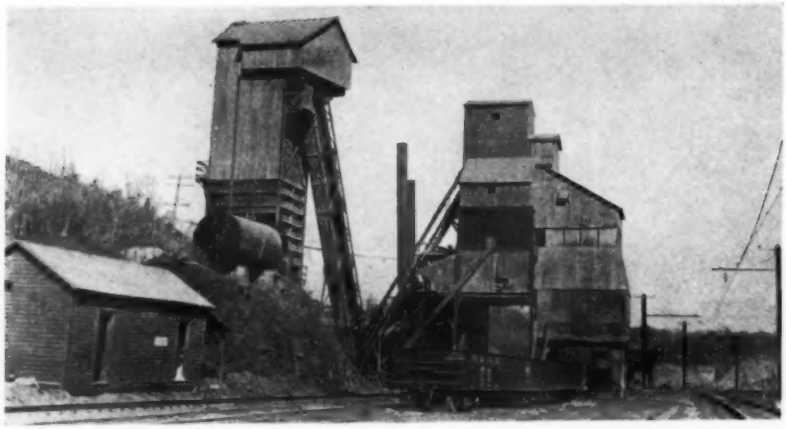
During the time the 75-B shovel has been here, the two machines have never worked on similar loading. Superintendent Dotter has this additional reason for completing the new level. He finds the 75-B a faster machine, with apparently just about as much power as its bigger brother, and he is anxious to get the two working in the same rock face to see which can load out the most stone.

Hauling Difficulties Cut Shovel Output

Hauling from quarry to crusher is done by five 7½-ton Mack trucks equipped with Easton Car and Construction Company rear-

● *These three 6-inch blast-hole drills are rushed to put down holes fast enough to keep ahead of the 75-B shovel.*





● *The Amiesite plant takes almost one-quarter of the output of the quarry and combines it with asphalt for use on road paving work.*

dump bodies. Although two ramps have been graded down to the new pit, the pit itself is so narrow that, at present, an empty truck can reach the shovel only after a loaded one is well on its way up the grade to the crusher. Carl Kinney on the 75-B has plenty to keep him busy just the same. For at least a week much of his time must be spent pulling rock from the bank in front of him—widening out the new pit so he can get capacity production. Meanwhile it is up to Operator Walker on the 100-B to keep up the plant's production. Orders must be filled, and a never ending stream of trucks speed back to him from the crusher.

At the upper end of the new pit three 6″ blast-hole drills, a Sanderson "Cyclone," a Loomis "Clipper," and a Keystone, are putting down 20-foot holes spaced 10 to 12 feet apart. This close spacing is made necessary because the rock, when blasted, has no way to go but upward. Work on the new pit has been going on for a month—the beginning being the hardest. In another month there will be room to turn around down there, and before long both shovels will work on the lower level.

Before leaving the quarry we inquire about stripping. A 3- to 10-foot cover of dirt has to be removed. On this work a 1-yard Bucyrus-Erie GA-2 shovel is used, spending half its time stripping and the rest on stock-pile work. The overburden is loaded into trucks and hauled away to the dump nearby. Just at present, Operator Mike Ahern has been working the GA-2 on grading a new space for stock piles. When this is finished this utility machine will be moved a quarter of a mile back up to the top of the quarry face.

● *Opening the new pit involves extra hard digging because there isn't room yet for the dynamite to throw the rock—the 75-B has to pull it out of the bank.*

75 Sizes of Stone Produced

While the layout of the rock crushing and screening plant is conventional enough, this remarkable set-up can produce on a few moments' notice any one of 75 different specifications of stone size. Rock from the primary crusher passes over a Robbins 5′ x 10′ vibrating screen, the rejects being carried up by a bucket elevator to the secondary crusher, a 515 type TZ Traylor. Another 5′ x 10′ Robbins screen catches the rock from this crusher. What passes over goes to two reduction crushers, a Simons 4-foot cone, and a Traylor 6-inch gyratory. The stone passing through these crushers and this first pair of screens passes up a second chain of buckets to the top of the screening plant. From this point the stone descends over five more vibrating screens:

2—Hummer single 4′ x 8′ screens
1—Niagara single 4′ x 8′ screen
1—Niagara double 4′ x 5′ screen
1—Niagara double 3′ x 6′ screen

Naturally, screen sizes are changed frequently to meet specifications on incoming orders. We learn from Superintendent Dotter that the plant actually ships during the season 75 separate sizes of stone, ranging from dust to 2½″ x 3½″ ballast stone.

15% to 20% of Stone Output Absorbed by Bituminous Concrete-Plant

An important share of the tonnage of the Glen Mills plant is shipped as Amiesite, that mixture composed principally of rock and asphalt which has come to be accepted more and more as the logical material for surfacing and patching "macadam" highways. During 1934, the state of Pennsylvania devoted the major portion of its expenditures from the highway funds to secondary roads, and the Glen Mills plant shipped a substantial part of its output, both crushed stone and

(*Continued on page 301*)

● *A section of 30-inch sewer being laid on Burnham Road. Machines were used to excavate the trench and do the back filling.*

PWA Funds Aid City to Improve Residential District

Lowell, Massachusetts, uses cranes and hand labor on $300,000 sewer project

By **E. J. O'CONNOR**
PROJECT ENGINEER

THE FEDERAL Emergency Administration of Public Works has made it possible for many cities and towns to undertake much needed projects at this time, which, were not this agency in existence, would have to be indefinitely postponed. As a result of an initial loan of $108,000 and grant of $32,000 to Lowell, Massachusetts, modern sanitary facilities are being installed in the Belvidere Park Section of that city. This section, on an eminence overlooking the beautiful Merrimac River Valley, is one of the choicest locations for home building to be found in any city. Up to now, its growth has been retarded because these facilities were not available.

The sewer project being undertaken by the city of Lowell as contractor on a force account basis will, when finished, involve the expenditure of $300,000. The plans call for the construction of: a trunk sewer, consisting of 200 feet of 48-inch, 2100 feet of 30-inch, and 1200 feet of 24-inch diameter reinforced concrete pipe, with an outfall into the Merrimac River; two interceptors each 1,000 feet long, one, 36 inches and the other 18 inches in diameter; and a lateral system totalling approximately 8,000 feet in length of plain concrete pipe of 12, 10, and 8-inch diameters.

Actual work commenced in June 1934, and completion of the entire system is expected by December 1, 1935.

Hand Labor Spreads Employment

On the trunk sewer, because of the open country, the open cut method by machine has been used. On the laterals, hand labor has been used to a great extent, although it is slightly more costly.

Three complete crews, thirty men, were employed on the lateral system over a period of six months, working four days a week and 7½ hours per days in the winter. During the longer days of summer, additional crews were employed. With one-half the project completed, approximately $100,000 has gone directly into the hands of labor. The lateral system (to 12-inch diameter) has cost approximately $10 per running foot complete, and the trunk sewer (mostly 30-inch) with the open-cut method by machine approximately $12.50 per running foot.

● *The 5-ton outfall unit is lowered into place on the river bed.*

Special Cast-Iron Outfall Used

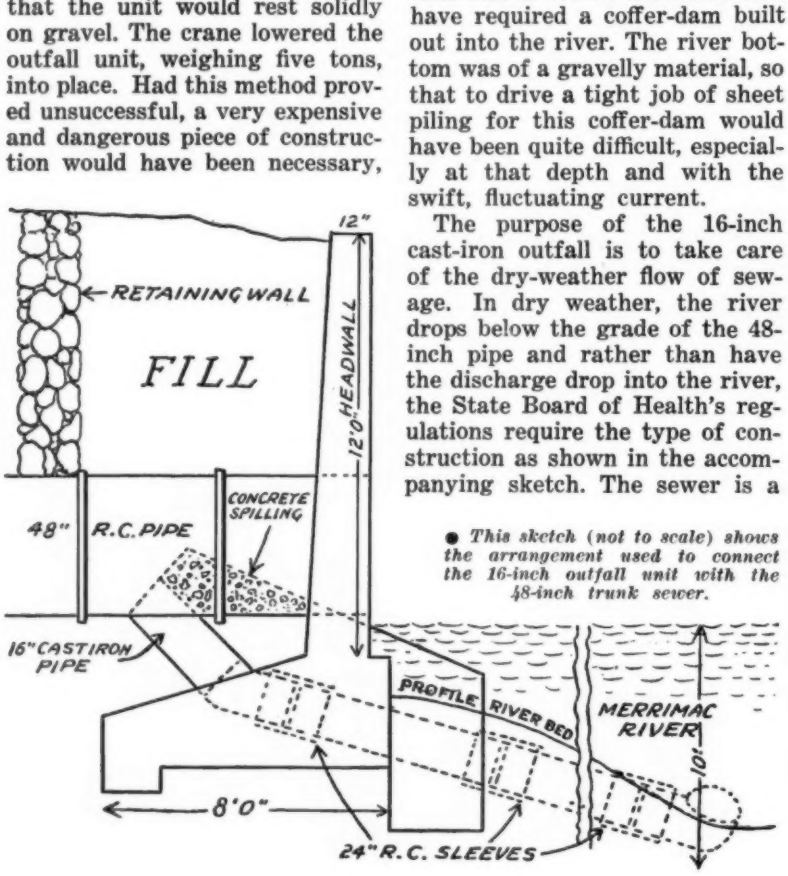
The construction of the outfall presented a rather difficult problem due to the use of the Merrimac River for industrial purposes, which caused its height to vary as much as five feet within a few hours. Consequently, it was decided to treat the forty-foot cast-iron outfall as a unit. This pipe was composed of four separate sections of 16-inch cast-iron pipe. These were fitted together and calked on the river bank. To insure strength of the unit, three 24-inch reinforced concrete sleeves, made from standard culvert pipe of this material, were slipped over the joints, the space between the concrete pipe and cast-iron pipe being then filled with grout.

A resting place on the river bottom was excavated by a Bucyrus-Erie 1030 clamshell machine, which was rented to the city by the owner, Joseph Malaguti & Sons of Plymouth, Massachusetts, and operated by Adam Armstrong. Approximately six feet of muck was removed so that the unit would rest solidly on gravel. The crane lowered the outfall unit, weighing five tons, into place. Had this method proved unsuccessful, a very expensive and dangerous piece of construction would have been necessary,

● *Left: A section of 48-inch pipe is lowered to the bottom of the trench. Right: hand labor was used as much as possible on this sewer project. This deep cut was well shored to prevent cave ins.*

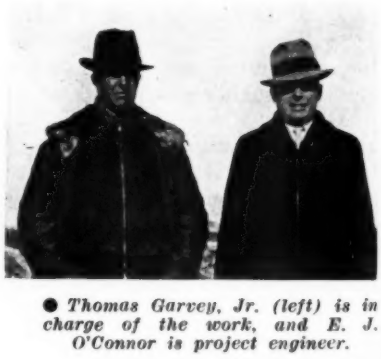
since the river at this point is extremely swift, with an average depth of sixteen feet at the outlet end. The alternate method would have required a coffer-dam built out into the river. The river bottom was of a gravelly material, so that to drive a tight job of sheet piling for this coffer-dam would have been quite difficult, especially at that depth and with the swift, fluctuating current.

The purpose of the 16-inch cast-iron outfall is to take care of the dry-weather flow of sewage. In dry weather, the river drops below the grade of the 48-inch pipe and rather than have the discharge drop into the river, the State Board of Health's regulations require the type of construction as shown in the accompanying sketch. The sewer is a combination system, in that it takes care of surface water as well as house sewage.



● *This sketch (not to scale) shows the arrangement used to connect the 16-inch outfall unit with the 48-inch trunk sewer.*

In addition to the clamshell machine mentioned previously, good use was made of a Bucyrus-Erie 1035 ¾-yard dragline machine, rented to the city by Jeremiah Sullivan Sons Company, Cambridge, Mass., and operated by Frank Newman. The dragline excavated the trench to grade for the 48, 30 and 24-inch trunk sewers; the clamshell machine followed along behind, laying the pipe and backfilling the first few feet over the pipe. The balance of the backfill was done later by both machines. The maximum depth of the cut was 16 feet, and a slope of approximately 1:1 was maintained along the sidewall of the trench. Two Ingersoll-Rand 175-cu. ft. compressors furnished air for sheathing driving pur-



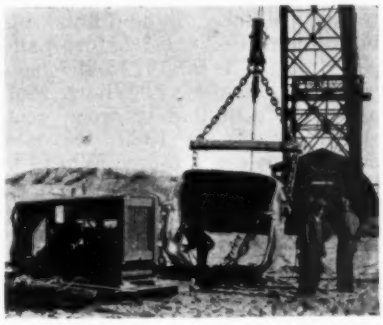
● *Thomas Garvey, Jr. (left) is in charge of the work, and E. J. O'Connor is project engineer.*

(*Continued on page 285*)

Field Notes

Field Repairs Quickly Made

EVEN ON the sandy wastes, through which the All-American canal will eventually carry needed water, the latest wrinkles of construction and maintenance equipment are found. The accompanying illustration, shows a Lincoln arc-



welder, driven by a gasoline engine, doing some repair work on a 12-yard bucket. Buckets on this job are watched carefully and worn parts are resurfaced or reinforced as necessary through use of this portable welding unit. There is a long job ahead of this bucket and the walking dragline behind it. They must handle their share of 40,000,000 yards now under contract.

Handy Device for Attaching Warning Flags

WARNING FLAGS are necessarily, in many instances, hurriedly attached to ropes, canvas covers, and other places, where a knot and other usual means of attachment is out of the question and cannot be made. Two inexpensive alligator testing clips can be secured to one of the loose flags and kept quite handily in the kit for these occasions. Open up the ferrule a bit, run the hem side of one of the corners of the flags into it and close down firmly on the cloth. The clips have a considerable opening, the jaw spring is not too strong but will hold firmly, and will serve as a means of placing a flag with no difficulty in the least. They are inexpensively procured from any stock counter of radio supples.

Frank W. Bentley, Jr.

Can Opener Used to Cut Sheet Metal

HERE IS a handy kink which I recently happened onto and have used successfully—the use of an ordinary can opener for cutting openings in sheet metal—openings of any shape—and even for cutting sheet metal in two. I find that for certain purposes a can opener is far superior to a pair of metal shears, chisel, or other methods commonly used. The objection to shears is the interference of the metal to the working hand and the fact that the metal must be bent away to some extent in order that the shears can be put through.

A can opener does not present any such interference difficulties and as a result both parts of the sheet metal—the part cut away and the part remaining—do not become bent.

Simply punch a hole with the point of the can opener, as indicated on the sketch, just as you do when opening a can,—and proceed. In the sketch the solid line is the portion cut and the dotted line is the uncut portion. To cut out an ellipse, circle, or any other shape with a can opener becomes a very simple matter.

— W. F. Schaphorst, M.E.

Sunstrokes in Excavating

IN VIEW of a present tendency to provide jobs for the unemployed, as a humanitarian provision, it is not to be overlooked that other humanitarian considerations argue against certain types of hand labor. Ditching machines never get sunstruck.

There is a widow in Pennsylvania who probably wishes that her husband's employer had used a machine, instead of him, to dig a ditch.

Thomas Clancy left his Pittsburgh home in the morning, apparently in good health. All day, until 5:30 in the evening he dug a ditch exposed to the sun's rays, which registered as high as 97 degrees.

When his day's work was done he started for a street car to go home, but walked so unsteadily that an observer thought he was intoxicated. A few blocks away from the job, he was found unconscious and never regained consciousness.

The employer's insurance company contended that no award was due the widow under the Pennsylvania Workmen's Compensation Act, arguing that no accident had occurred in the course of Clancy's employment. But in the case of Clancy v. Booth & Finn Co., 167 Atl. 393, the Pennsylvania Superior Court upheld an award in her favor, saying, in part:

"A sunstroke is a compensable accident. * * * The position taken by the appellants seems to be that the actual 'stroke,' so called, causing complete collapse, must occur in the course of the employment, and that when the employee stops working, whatever happens thereafter cannot be made the subject of compensation. Surely, if this man had left the trench where he was working, and gone a few feet and collapsed, one would hardly be able, with any show of reason, to argue that the accident did not occur during his employment, although what might be called its culmination did not occur until a short period of time intervened. Following the same line of thought, when the workman, in this present case, left work and succumbed a few blocks away, and in the meanwhile, for a portion of the distance which he traversed, staggered so, as already stated, that his fellow workmen thought he was intoxicated, we think it was a reasonable deduction that he was stricken at work, and that the loss of consciousness and subsequent death were attributable to the prostration occurring during his employment."

—Arthur L. H. Street, Attorney at Law.

EXCAVATING ENGINEER
FOUNDED 1905

A Monthly Publication Devoted to Excavating and Allied Subjects

The Excavating Engineer Publishing Co.
South Milwaukee, Wisconsin

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

E. M. HEUSTON
Advertising Manager

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A Lesson From Another Industry

ONE OF THE most amazing features of the business recovery enjoyed by the United States during the past two years is that practically all the net gain in the volume of industrial production was contributed by three automobile manufacturers. In other words the increase in business of these three leading corporations was approximately equal to the net increase in business enjoyed by the manufacturing industry as a whole.

With this in mind, it certainly behooves each industry to study carefully the reasons for this increase—the things which made it possible for them to increase their volume so radically.

The first reaction is, perhaps, that the American people desired modern transportation, desired modern appearing and modern performing automobiles. But this in itself is not enough to account for the increased business in the automotive industry because, after all, the American public have a great many wants which have persisted during the depression, and which, during the depression, have not been satisfied — wants which exist today as strongly as they ever existed. For example, the average American family today desires a modern, attractive dwelling just as much as it desired one in 1929.

The reason for the automobile industry's amazing pick-up during the last two years lies in the fact that they offered the public increasingly better values at progressively lower prices so that today, in spite of depression and in spite of reduced incomes, the person who buys a small motor car does so with the firm conviction that he has obtained a real bargain — has got more for his money in transportation, performance, and satisfaction, than he was ever able to obtain before. And he is right in this conviction, and that leads us immediately to the question: How did the automobile industry bring this about?

An answer can be given in two words, "modern equipment," but the answer needs considerable enlargement if the full significance is to be realized. We quote as follows from a report made by investigators for the National Industrial Recovery Board published early in February:

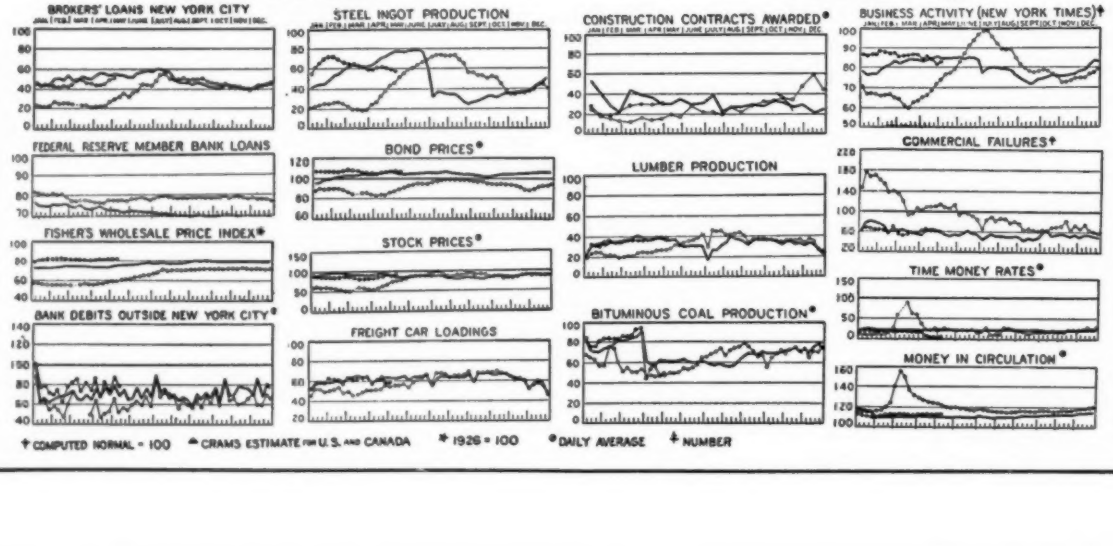
"In one plant the door on the 1935 model is made in two stamping operations in a matter of seconds. The 1929 automobile door had twenty-six different parts and required several times as many men to produce it. The use of the 'spot and flash' welding machine today enables two men to do what it took six welders and twelve finishers to do in 1929.

"Engineering was shown to have cut labor costs with amazing rapidity. Body framing cost $3 in 1929; it costs thirty cents today. Where hand finishing body-frames of wood before paneling cost $3 in 1929; it costs twenty cents today. Where roof assembly complete in wood cost seventy cents in 1929; it costs twenty-five cents today. Where it cost sixty cents to hang one door before the depression; it costs nine cents to hang four doors today. Where body trimming cost $12 in 1929; it costs $4 today."

Only by such astonishing accomplishments has the automobile industry been able to set before the public a motor car value which has stimulated buying. Only by similar dramatic action will the construction industry be able to stimulate private construction—that great back log of prosperity which, when active, carries all other industry with it.

The modern construction equipment of today far surpasses anything that was ever before available. Many construction men during the past two years have proved their ability to accom-

WEEKLY BUSINESS INDICATORS


WEEKLY AVERAGE 1923-1925 INCLUSIVE = 100
LEGEND 1935 1934 1933
BROKERS' LOANS NEW YORK CITY
STEEL INGOT PRODUCTION
CONSTRUCTION CONTRACTS AWARDED*
BUSINESS ACTIVITY (NEW YORK TIMES)†
FEDERAL RESERVE MEMBER BANK LOANS
BOND PRICES*
LUMBER PRODUCTION
COMMERCIAL FAILURES†
FISHER'S WHOLESALE PRICE INDEX*
STOCK PRICES*
TIME MONEY RATES*
BANK DEBITS OUTSIDE NEW YORK CITY*
FREIGHT CAR LOADINGS
BITUMINOUS COAL PRODUCTION*
MONEY IN CIRCULATION*
† COMPUTED NORMAL = 100 * CRAMS ESTIMATE FOR U.S. AND CANADA * 1926 = 100 * DAILY AVERAGE ‡ NUMBER

plish through modern and efficient management astonishingly low costs and amazingly fast work with this modern equipment. It's up to the construction industry as a whole to take heed of the lesson offered to it by the automotive industry and by decisive, vigorous leadership place itself on the same level that the automobile industry has attained.

Price or Value?

RECENTLY an important government official asked for bids on certain items. To his amazement . . . and deep concern . . . the bids were identical. "What," he questioned, "is the world coming to? How can purchasers purchase to advantage when there are no price differentials? Is this the end of sound business practice?"

And as each one of us considers the full import of the present tendency towards the submission of identical or near identical price bids—for similar services and products, we too are minded to ask ourselves, "Are there no longer any bases other than those of price by which we can judge whether or not to buy one product or service in preference to another?"

We believe there are such other bases! To deny this fact would be to repudiate the buying and selling truths of economic history—and of human experience. We know that, for every product, service, implement or machine, there exist definite, measurable qualities which determine their value. This applies as truly to a carpenter's hammer as it does to a railroad locomotive.

Let us take two power shovels for example. In the hands of the same skilled operator, one does ten hours' work in eight. The other does eight hours' work in ten. The difference here is in performance. In another instance, one shovel lasts twice as long as another. The difference here is in workmanship and quality of materials used. Thus, with any product or service, upon reflection, equally important differences readily come to mind.

Most of us have learned, during the last few highly instructive years, that to buy strictly on price is only to cheat ourselves. We are now beginning to realize that we must return to the sensible, time-proven method of quality buying—for economy's sake.

William J. Olcott

WILLIAM J. OLCOTT died April 29 in Pasadena, Cal., of pneumonia which followed a stroke occurring two weeks previously. Mr. Olcott was President of the Oliver Iron Mining Company from 1909 to 1928. Following his retirement he had resided in Pasadena until his death which occurred at the age of 73.

Mr. Olcott was a native of Detroit and a graduate of the University of Michigan in 1883. His first job after leaving the University was as Assistant Mining Engineer at the Chapin Iron Mine, Iron Mountain, Michigan. In 1894 he came to Minnesota to become General Manager of the Lake Superior Consolidated Iron Mines of the Mesabi range. He became Vice-President of the Duluth, Missabe & Northern Railway in 1897 and was later elected President. In 1909 he became President of the Oliver Iron Mining Company.

Mr. Olcott was an unusual man, possessed of high ideals. He took great interest in youth. He was a man of great benevolence. Among his many gifts for charitable purposes was the Fanny Bailey Olcott camp for Girl Scouts at Half Moon Lake, near Eveleth, Minnesota.

He is survived by two daughters, Mrs. Torrey Ford of Duluth, and Mrs. Leonard Elsmith of Cambridge, Mass. Mrs. Olcott died in Pasadena several years ago.

The body was brought to Duluth, where many of his friends reside, and where the funeral services were held May 6.

P.W.A. Funds Aid City to Improve Residential District

(*Continued from Page 282*)

poses and also for jack hammers on rock excavation.

Work Progresses Rapidly

Despite a severe winter, good progress has been made on the trunk sewer. Approximately 1500 feet of 30-inch trunk sewer have been completed since October 6. This amount of work was done with only one shift per week. All operations stopped for two weeks in January because of a severe blizzard. Prior to October 6, 200 feet of 48-inch and 950 feet of 30-inch trunk sewer were completed.

Thomas Garvey, Jr., Assistant Superintendent on sewer construction for the city, is in direct charge of the work. He is assisted by John Maguire, Foreman on the trunk line, and Michael Sullivan, John Blessington and William Gillin, Foremen on the lateral system.

Inspection is handled for the city by Andrew Lavigne, Assistant Sewer Engineer, and Harry McGuinness, Inspector. Thomas M. Curley is Resident Engineer Inspector for the Federal Government. The author supervises the project as a whole.

● *Another section of pipe is placed in position in the open cut while ahead, a Bucyrus-Erie ¾-yard dragline excavates the trench.*

EQUIPMENT
You Ought to Know About

New 5-Yard Walking Dragline

TO THE Bucyrus-Monighan family of walking draglines has recently been added the new 5-W, a machine outstanding in its compactness and easy-to-ship features and having the lowest bearing pressure of any dragline of its capacity.

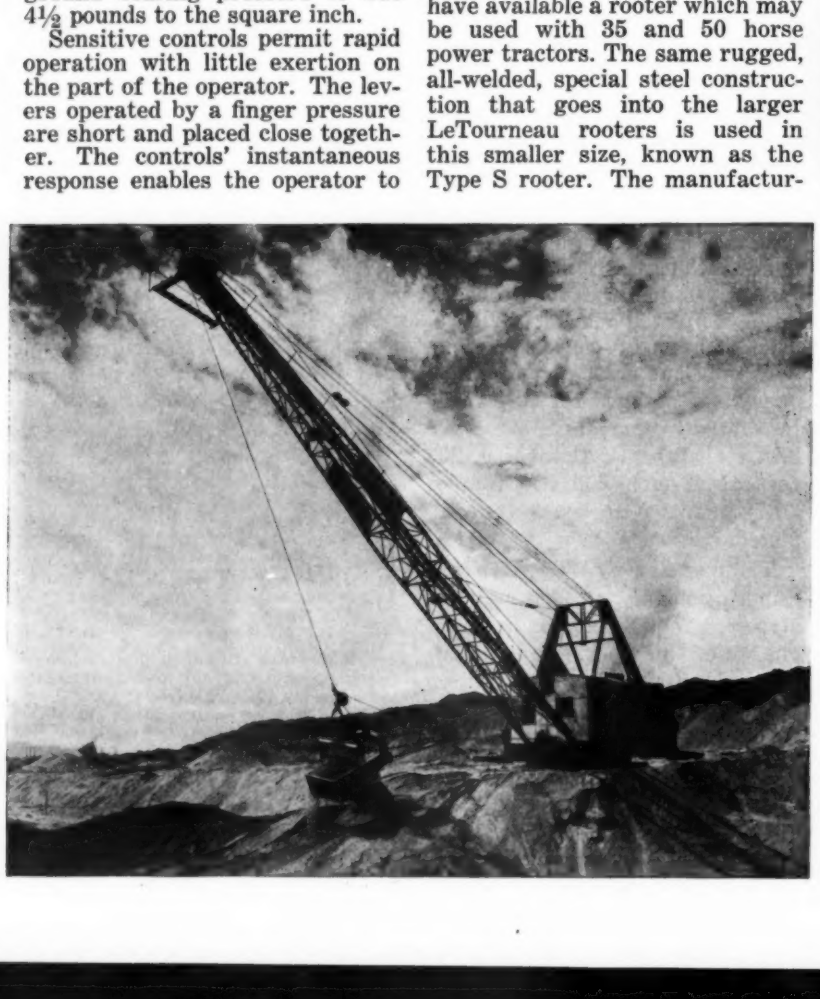
The center section of this machine's revolving frame with all principal machinery assembled in place, is shipped in one unit on one car. This permits easier shipment from the factory as well as from job to job, and saves many more days time in assembly on the job and disassembly when the machine must be reshipped.

Swing mechanism and fuel oil tanks are below the deck, and the machine is so balanced that little dead counter-weight is required. This elimination of excess weight further achieved by electric-welded construction, reduces the ground bearing pressure to but 4½ pounds to the square inch.

Sensitive controls permit rapid operation with little exertion on the part of the operator. The levers operated by a finger pressure are short and placed close together. The controls' instantaneous response enables the operator to keep the bucket constantly on the move, which naturally results in maximum yardage.

Like with all other Bucyrus-Monighan walking draglines, direction of travel of the 5-W is governed by simply pointing the boom. The machine travels in straight lines and because it can instantly step off in any direction it can excavate cuts wider than its boom length depositing spoil to one side only.

While digging the machine rests on its large circular base. There is practically no wear or tear on the traction surfaces because no moving parts touch the ground. Bucyrus-Monighan draglines are sold by Bucyrus-Erie Company, South Milwaukee, Wisconsin.

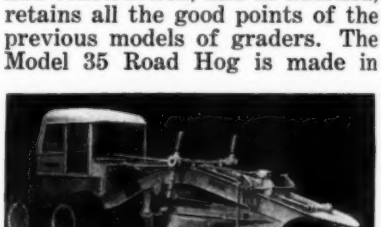


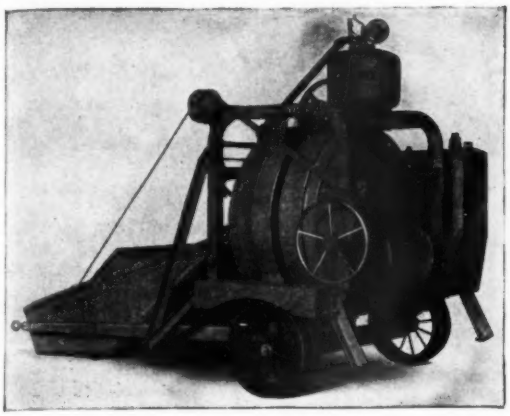
LeTourneau Rooter

R. G. LeTOURNEAU, Inc., Stockton, California, now have available a rooter which may be used with 35 and 50 horse power tractors. The same rugged, all-welded, special steel construction that goes into the larger LeTourneau rooters is used in this smaller size, known as the Type S rooter. The manufacturer states that the Type S rooter will handle much of the ripping and scarifying usually handled by larger rooters, and so free large tractors for heavier work. Brief specifications of the Type S rooter are: Length over all, 13½ feet; width over all, 75 inches; weight of 3-tooth rooter, 4280 pounds; and weight of 5-tooth rooter, 4760 pounds.

Warco Road Hog Grader

W. A. RIDDELL Company, Bucyrus, Ohio, has just recently announced the new modernized Rear Controlled Model 35 Road Hog Grader which, they state, is entirely new in design and construction, and in addition, retains all the good points of the previous models of graders. The Model 35 Road Hog is made in two sizes, so constructed that all standard makes of tractors may be used. The machine has a welded rigid frame with five cross braces of tubular and box section construction. All connections are hardened ball joints with machined adjustable bearings. It has a large 61½" full circle with adjustable take-up to eliminate all chatter. The manufacturer equips the machine with a two-speed, variable control, power lift which gives faster movement to the blade, cross shift, circle turning, and scarifier at normal RPM of motor or at low throttle. The new power control assembly is grease tight, with drop forged, machined and hardened gears and clutches, operating on ground splined shafts with replaceable bronze bushings and patented oil seals. The cab is of the large turret type with adjustable upholstered seat. Machine is equipped with a 54-gallon gas tank mounted in rear of the cab.





Wheel-Mounted Concrete Mixer

THE RECOGNITION of contractors' requirements to meet present day construction methods, has caused Koehring engineers to develop the 14-S Dandie Trail-Mix—with modern features for fast, easy, and economical operation. The 14-S Dandie Trail-Mix is a standard Koehring 14-S Dandie mixer, mounted on two steel or rubber-tired wheels. This large capacity mixer, suitable for bridge, culvert, alley, and building construction, weighs only 5100 pounds. The exceptionally narrow width—only 90 inches—permits "spotting" in congested quarters ready for pouring concrete. The end-discharge pours concrete directly to bridge and culvert forms, alleys or floors. The Koehring Automatic Skip-Flow Shaker causes a shaking action along the natural flowline of the material. The shaker arm raises the complete skip structure within the slotted pivot bearings. Easy and simple operation is accomplished by the many automatic features—opening of the water tank valve — skip-clutch knockout and brake — skip-flow shaker—self-locking, hand-wheel controlled, discharge chute—full operating vision. Other features built into the machine by the manufacturer include: anti-friction bearings; full spring mounting; self-leveling skip; V-belt drive winch; and accurate syphon type tank. Complete information about the Trail-Mix can be obtained by writing the Koehring Company, 3026 W. Concordia Ave., Milwaukee, Wisconsin.

Lincoln Welding Electrode Resists Abrasion

A NEW HARD surfacing electrode, known as Abrasoweld, manufactured by The Lincoln Electric Company, Cleveland, Ohio, is stated to be of particular value in such applications as restoring teeth, lips and bottoms of power shovel dippers; lugs and treads of tractors: housings and impellers of centrifugal sand pumps; rock crushing equipment; and gear and pinion teeth. Abrasoweld provides a deposit of abrasion-resisting alloy of the self-hardening type which surface hardens very rapidly under conditions of impact and abrasion. The tendency of a deposit to chip off in service is eliminated.

Tires Develop Full Traction

FIRESTONE Tire and Rubber Company, Akron, Ohio, has developed a heavy duty, powerful traction tire, known as the "Ground Grip" for the roughest kind of work, including mining and construction. The tread has tremendous grip, states the manufacturer, will not clog up, yet rides smoothly on the highways and does away with bumping experienced in other so-called traction tires. The new tires, shown above, are mounted on an International tractor and Austin-Western trail car at work in a big, coal stripping operation near Danville, Illinois.

Trailer Available for ⅜-Yard Shovels

A NEW 10-B trailer for carrying their 10-B excavator from job to job—over long, or short distances; fast and economically—is now being offered by Bucyrus-Erie Company, South Milwaukee, Wisconsin, to its 10-B shovel customers.

This uniquely simple, practical and convenient trailer, with front-axle steering, dual-pneumatic tires, front and rear, rear-wheel brakes, and a remarkably simple and effective loading system, give speed and safety in 10-B transportation. It meets required highway regulations in practically all states.

The manufacturer states only four simple steps are necessary in loading. First, the trailer front axle is disconnected. Second, the shovel moves into place over the rear assembly under its own power. Third, the trailer is re-assembled, and the frame raised into position with the built-in screw jack. Fourth, the machine is fastened by clamping the excavator axles to the trailer frame. It is then ready to go places—in a hurry. The traction belts are suspended outside the trailer frame, with ample clearance—10 inches — above the ground. Overall height of the 10-B shovel mounted on the trailer is only 10′8″, and the weight on each axle of the trailer only 10,300 pounds. The loaded trailer can be turned around in a fifty-foot street without backing.

SHOTS *from the Firing Line*

Supreme Court Rules on Parker Dam

IN A DECISION issued April 29, the U. S. Supreme Court declared that construction of Parker Dam, 150 miles down river from Boulder Dam, had not been properly authorized by Congress as is required by law and that, therefore, there is no need for granting an injunction against the state of Arizona to keep it from interfering with construction of the dam as asked by the Federal Government.

Parker Dam, now under construction by Six Companies, Incorporated, under the jurisdiction of the Bureau of Reclamation, is to be an integral part of the aqueduct system by which water from the Colorado River will be delivered to the cities forming the Metropolitan Water District of Southern California. Ever since this dam was first planned, the State of Arizona has shown determined opposition to its construction. Just recently the Governor called out the National Guard, who were hurried to the Arizona Shore of the dam site to prevent workmen of the Six Companies from stepping on Arizona soil. As a result, in January, the U. S. Government filed a bill in the Supreme Court to enjoin interference by Arizona. The Court's ruling of April 29 dismissed the bill. The decision, issued by the Court, reviewed the history of the Parker Dam Project and its relations to the Dam at Boulder Canyon, states that Parker Dam was not included in the Boulder Canyon act, and consequently not authorized. The decision also states that by long accepted practice no dam on a navigable river can be constructed without action by Congress.

Draftsmen Exempt from Code Hour Restriction

THE CONSTRUCTION Code Authority has recently issued a ruling in regard to the hours of employment for architectural and engineering draftsmen. The question was raised by a practicing architect who is drawing plans for a large building project and has a number of architectural and engineering draftsmen in his employ. According to the Code, the applicable regulations as to hours are those contained in Article III, Section 2 B of Chapter I. Therein it is provided that no employee shall be permitted to work in excess of forty (40) hours per week, with certain exceptions and limitations, of which the following are the provisions of Paragraph 3 (a).

3. The following classes of employees are exempt: (a) Employees engaged in professional, executive or supervisory work.

The Construction Code Authority's ruling states:

"Architectural and engineering draftsmen in the performance of their accustomed duties, when employed by members of the industry rendering professional service, shall be deemed to be engaged in professional work and therefore exempt from the provisions of Article III, Section 2 B, 3 (a) from the maximum hours of labor prescribed by the Code."

Hackett Appointed Assistant PWA Administrator

HORATIO B. Hackett, former director of the housing division of the PWA, has been elevated to the position of Assistant Administrator of Public Works. Mr. Hackett succeeds Maj. Philip B. Fleming, who returns to the Corps of Engineers.

Revised San Gabriel Plans Disapproved by Authorities

THE REVISED plans for San Gabriel Dam No. 1 were disapproved May 10 by State Engineer Hyatt and U. S. Forest Service Engineers on the grounds that the mixed material proposed to be used is inadequate for stability. The action is based on a report of a special consulting board consisting of C. D. Marx, W. L. Huber and F. C. Hermann. The Los Angeles County Board of Supervisors is trying to obtain reconsideration of the disapproval.

Bolivar Dam

BIDS WILL be received about June 25 for the construction of Bolivar Dam, near Bolivar, Ohio. The dam will be of earth fill construction involving approximately 591,000 yards of earth and 97,500 yards of rock excavation. This is a Muskingum Watershed Conservancy District project. Complete information about the dam can be obtained from the U. S. Engineers, Zanesville, Ohio.

A Master of the Shovel

A PAST MASTER in the delicate art of operating a power shovel is Louis Passarelli of New Rochelle, New York.

If you want your back scratched with the teeth of a two-yard dipper, without tearing your clothes, or your hat lightly brushed from your head without raising a bump on your cranium, Passarelli is guaranteed to be the man who can do it. When the sides of a deep sewer excavation in the Bronx, New York, caved in on one of the workers, Passarelli lightly and quickly removed the soil an inch at a time, until the workman's body was revealed and he was hauled to safety and quickly revived.

"I have been running a shovel for ten years and I just do the best I can," said Passarelli when interviewed by a reporter for the New York World Telegram.

—*The Improvement Bulletin.*

Heavy Construction and Railroad Code Approved

SUB-CHAPTER 11-B for the Heavy Construction and Railroad Contractors Sub-division of the General Contractors Division of the Construction Code was approved by NRA April 29, 1935 and becomes effective May 9, 1935. This is the second sub-chapter of the General Contractors division to be approved; II-C for the Highway Construction Sub-division having been approved March 16, 1935. This leaves Sub-Chapter II-A for the Building Construction sub-division still pending before NRA.

New England Road Builders Hold Annual Meeting

THE ANNUAL meeting of the New England Road Builders' Association was held April 16 at Boston, Massachusetts. Louis R. Perini was re-elected president. The theme of the various addresses stressed the value of highway construction as a quick means of employment relief and as a continuing necessity because of the demands of constantly increasing motor vehicle traffic. Joseph A. Tomasello, treasurer of the Association, presented an interesting cost analysis on a test project in Massachusetts on which complete and accurate costs were recorded as requested by the Bureau of Public Roads. The analysis shows that the total cost

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For Sale and Bargain Counter Section (Pages 304-305 and 308-311)

The Koehring Wheel Dumptor
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A fleet of the new "20 mile per hour" Koehring Dumptors, hauling, dumping and spreading on a road re-location project. Speed in spotting, speed in loading, quick get-a-way and instantaneous dumping—fast dirt-moving operations at new low-cost figures. Three speeds, forward or reverse, permit quick return to the loading unit—without turning or backing, resulting in shuttle service to any fill location.

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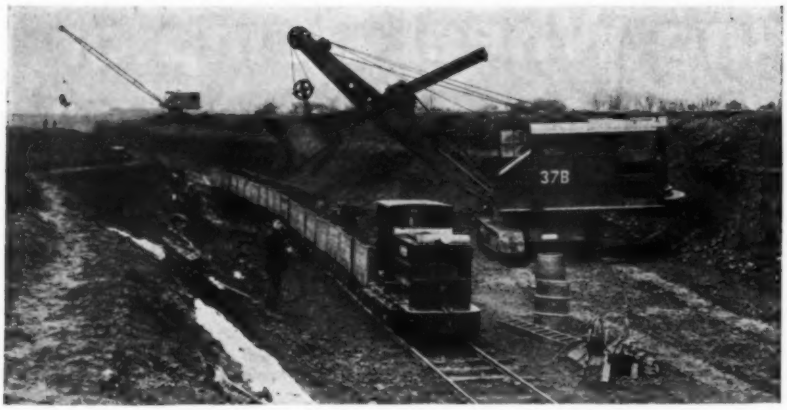


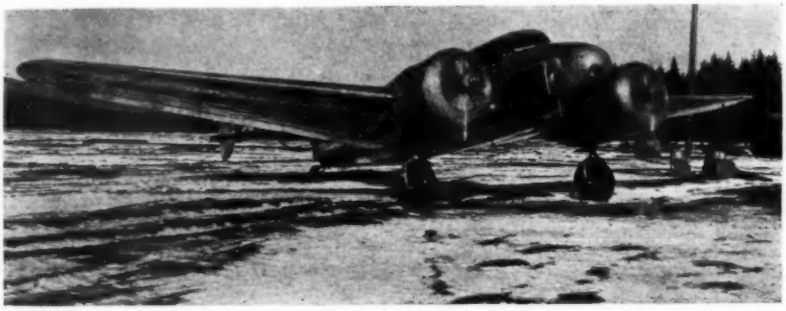
of the direct-labor work was 45 percent greater than the cost would have been if done by the contractor at the price submitted. The total cost was $104,015, compared with a contract bid of $71,708 for reconstructing 8,550 feet of road with a bituminous concrete surface.

Foreign Notes

England

Shown above is a typical mining scene in the iron ore region of South Lincolnshire. The machines are owned by the **Appleby-Frodingham Steel Company**, and are being used in their Cottesmore Ironstone Mines. In this region, the iron ore has between 5 and 6 feet of overburden. One of the interesting features connected with this operation is the unusual care exercised to restore the dumped overburden in such a way as to make it suitable for cultivation. The stripping is handled by a Ruston-Bucyrus 43-B equipped with 1¼-yard bucket on a 55-foot boom. The machine first removes the loam and then the subsoil, keeping the two separate and replacing them correctly over on the dump side so that the valuable soil is on top. The machine does this work so well that only two men are needed for incidental levelling. The ore is dug by a Ruston-Bucyrus 37-B 1½-yard Diesel-powered shovel. The shovel loads to dump cars of 1½-yard capacity which are hauled in trains of 18 cars by a Ruston Diesel locomotive. Since the shovel capacity is the same as that of the cars, the operator has to spot his dipper carefully to avoid spillage. In spite of this handicap he loads the train of 18 cars in from five to six minutes.

Also shown is a deep, open-pit, iron mine belonging to the **Irchester Ironstone Company**, a subsidiary of the Cargo Fleet Company, Ltd. At this mine, the overburden runs to approximately 50 feet and is removed by a Ruston-Bucyrus No. 300 steam shovel carrying a 5-yard bucket on a 90-foot boom. The machine has a dumping height of 67 feet at a radius of 114 feet. The 400-ton machine is mounted on railroad trucks with an equalizing beam to permit levelling when operating on uneven ground. Due to the extreme depth of overburden at the point shown on this photograph, a Ruston-Bucyrus 43-B dragline carrying a 1¼-yard bucket on a 55-foot boom is working on the top of the soil pile rehandling the excess and casting it farther away. The ore is taken out by a Ruston-Bucyrus No. 20 steam shovel carrying a 2¾-yard bucket.



Alaska Notes

By L. H. DELANO

Additional facilities for aerial transportation were provided at the opening of a new airport at Juneau, which was placed into service April 2. Shown below, is one of the new Lockheed Electra airplanes, which will be operated between Juneau and Fairbanks by the **Pacific Alaska Airways**, subsidiary of Pan American Airways. The new airport at Juneau is the most modern in Alaska aside from Fairbanks, and in addition has a seaplane landing basin which the latter airport does not have. The airport was built by the Pacific Alaska Airways. The excavating work at the airport was done by the **Seims Spokane Company**, well known Pacific Coast contractors. Part of the work consisted of building a seaplane landing basin which was dug out to provide a minimum depth of 6 feet. 80,000 yards of sand and gravel were excavated and trucked to the airport to be used as topping for the runways. The airport possesses unusual scenic features, one of which is the Mendenhall glacier nearby.

New England Notes

By M. E. POAG

Two Companies, Inc., were low May 7 with a bid of $1,330,765 for constructing core walls on the Quabbin Reservoir project at Enfield-Ware, Mass. The work consists of placing 4,000,000 yards of earth in the dam and sinking 38 concrete caissons.

JAMES F. POWERS

James F. Powers, 57, well known contractor died recently at his home in Brockton, Mass. Mr. Powers was well known among contractors in this section having been a member of the firm of Powers Brothers since 1901. He is survived by his wife Elizabeth A., and two brothers, William H. and Harold F. Powers.

The Kelleher Corporation, Turners Falls, was low May 7 with a bid of $59,718 for surfacing 3.5 miles of road

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Maximum Load
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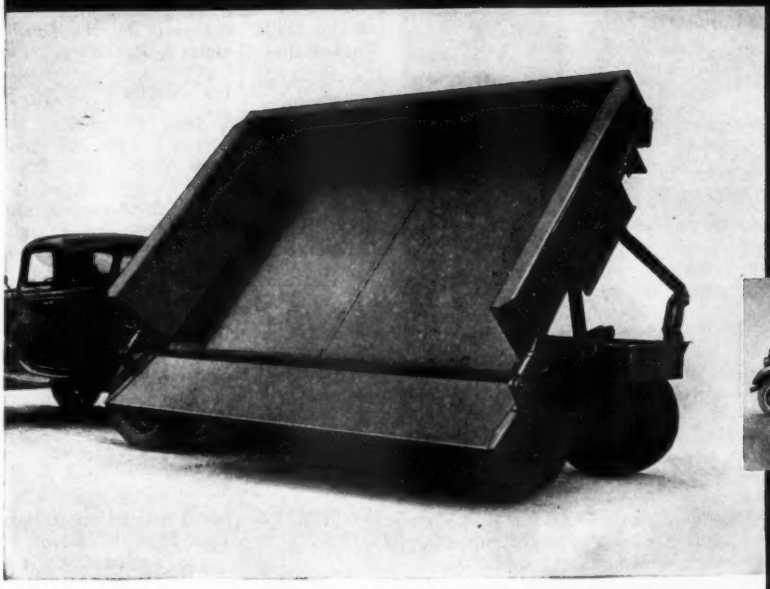
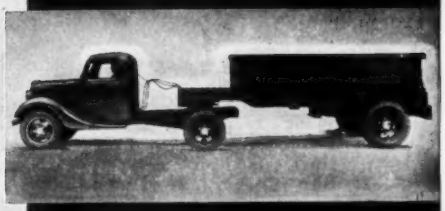


Hydraulic controls from the cab dump the body to (either side) while drop doors act as a chute to clear the load.



The 6 cubic yard model is illustrated above. Hopper Type (Bottom Discharge) models are also available in capacities of 10, 16, 20 and 25 tons, Side Dump models for 12 and 20 cubic yards.

The Austin-Western Trail Car
for 1½ and 2-ton truck-tractors

Above illustration shows the Trail Car servicing an Austin-Western Elevating Grader.

● The Trail Car cuts hauling costs by increasing the pay load, thus reducing the number of hauling units required on the job. It takes double the load that a conventional truck can carry on its own chassis, yet its dimensions and maximum load conform to every state limitation of semi-trailers.

A full universal fifth wheel provides a short turning radius, eliminates strains when hauling across uneven surfaces and permits the carrying unit to take all shocks when loading.

The hydraulic side dump is controlled from the cab by the driver, and the unlimited clearance plus a steep discharge angle make the dumping operation simple and rapid.

Trail Cars for truck-tractors of every make and power are also available. Use the coupon for information on the one described above or any other size and design you require.

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near Otis, Mass., with stone and tar mixed in place.

R. H. Cone, Hartford, Connecticut, has recently completed excavation of the foundation for the new laboratory at Trinity College in Hartford. Shown below, one of his Bucyrus-Erie Steamers loads a Mack truck. This was one of those jobs dirt movers like to handle but only get once in a while. The work called for the removal of practically 4000 yards, mostly gravel.

O'Neil Bros. of Hartford, Connecticut, have recently completed excavation work in connection with the Metropolitan Sewer, a PWA project. Shown above, their Bucyrus-Erie Gas+Air clamshell machine loads a Mack truck. From one section of the sewer, 4000 feet long, 10 feet wide, and about 14 feet deep, 15,000 yards of material, mostly quicksand, was removed. The construction of the sewer took about one year's time. Every foot of the excavation had to be timbered and braced, and the presence of water necessitated the use of wellpoints.

Maryland Notes

The State Roads Commission awarded 4.57 miles of road construction in Talbot County to **Phillips Bros.**, of Salisbury for $145,359.

West Virginia Notes

Shown here is a general view of Lock and Dam No. 2 on the Kanawha River at Marmet. The dam is 557½ feet long from the river wall of the locks to the abutments on the other side of the river. Five roller gates control the water level in the storage basin. Four of them are hollow steel cylinders approximately 20 feet in diameter and 108 feet long. No. 4 gate differs from the others in that the drum is smaller in diameter and is provided with a motor-driven hinged flap on the top side which can be folded down over the drum to create a floodway 5 feet in depth for sluicing purposes. The twin locks provide ample facilities for navigation on the river. The dams and locks were built under the supervision of the U. S. Engineers by the **Dravo Contracting Company**, Pittsburgh, Pa.

Ohio Notes

Hamer Bros., Inc., Greenville, received award to construct the Piedmont Dam, on Stillwater Creek, near Piedmont for $442,725. This is one of the dams included in the flood control and water conservation program of the Muskingum Watershed Conservancy District.

Wisconsin Notes

Lyons Construction Company, Whitehall, Michigan, was recently awarded a contract, amounting to $123,500, for dredging 325,000 cubic yards from the Fox River at Green Bay.

St. Louis and Vicinity

By A. J. KOENIG

Contract for the construction of Dam No. 26 across the Missouri River at Alton, Illinois, was awarded by the Government to the **Engineering Construction Corporation** of New York, on their low bid of $4,865,716. The contract price was fifteen percent higher than estimate.

Government grants for the **elimination of eighteen grade crossings** in St. Louis, of which seven have been approved by John I. Quinn, district bridge engineer for the United States Bureau of Public Roads, have been asked for by city officials. The projects approved by Quinn will cost approximately $2,500,000.

J. F. McMahon Construction Company was awarded contract for waterworks and sewer distribution system at Bland, Mo. for $33,078.

J. Marsch, Inc., Chicago, Ill., was awarded contract for the eastern and

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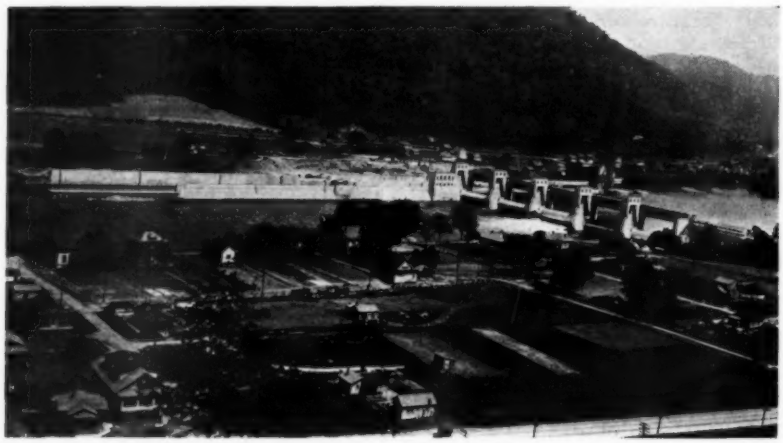

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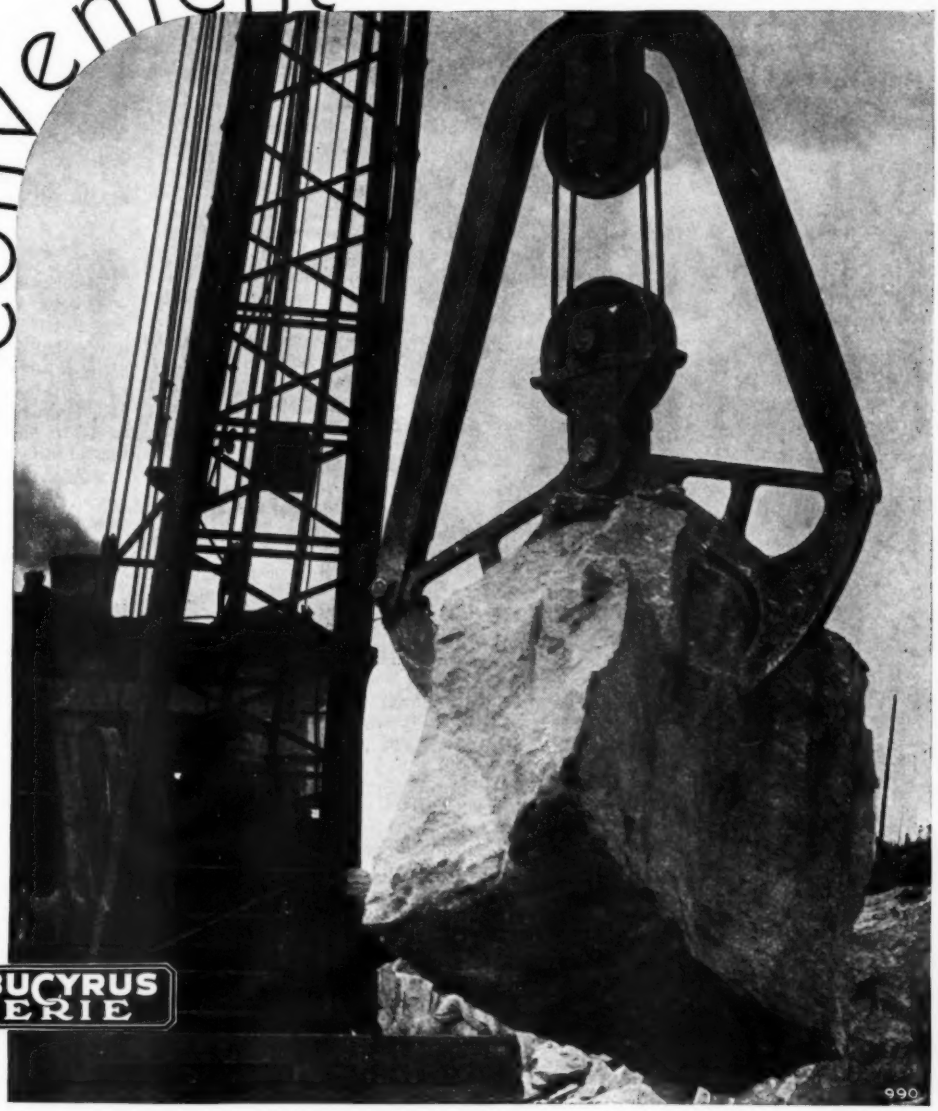
YOUR crane swings it over the rock pile, a floor man guides it to place. The crane lifts, away goes the rock, safely, surely . . . to be set down just where you want it. There is no "monkey-business" with this rock grab . . . it's simple, it holds fast till you want to let go . . . there is nothing to wear out or to get out of order. The savings its convenience makes possible run into big money. Five sizes . . . 2½ to 20-ton capacities . . . write for complete data on the Bucyrus-Erie Rock Grab.

convenient



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EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

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Shots From the Firing Line— *Continued*

western approaches of the new single track railroad bridge across the Missouri River from St. Louis County to St. Charles County for $324,804.

River Notes

Rock Island District

R. J. Ryan, Inc. and **A. Clark & Sons**, Walcott, Iowa were awarded contracts amounting to $44,000 for clearing the pool area above Lock Dam No. 20 near Canton, Missouri and extending up river to Lock and Dam No. 19 at Keokuk, Iowa.

New Orleans District

Atlas Construction Company, Dallas, Texas, submitted low bid April 17 of 12.28 cents per yard for the construction of the Lottie-Ramah Levee which involves 3,080,000 yards of earth work. This levee is a portion of the East Atchafalaya Basin Protection Levee. This Company was also low bidder April 23 with a price of 15.92 cents per yard for the construction of the Hamburg-Palmetto Levee which involves 8,700,000 yards of earth work. This project is a portion of the West Atchafalaya Protection Levee.

Bids submitted by private contractors at the letting April 26 exceeded the Government estimate of 21.64 cents for the construction of 2,000,000 cubic yards of earthwork in the Grand River-Bayou Sorrel levee. The lowest private bid submitted averaged 35 cents a yard. The work will be done by the U. S. Engineers.

Texas Notes

A construction project with international aspects, now under way, is that being performed by the **International Boundary Commission** along the Rio Grande River downstream from El Paso. While the International Boundary between Mexico and United States was established in 1848 as being at the center of the deepest channel of the Rio Grande, this river, like many other rivers subject to floods, had a habit of changing its course at intervals. In addition to the international problems arising from the fact that when the river changed its course, territory which might have been on the United States side would find itself a part of Mexico or vice versa, recurring floods would cause great loss to the inhabitants of the fertile valley and from which they could obtain no protection. Years of negotiation resulted in the forming of an International Boundary Commission by the two countries. The Commission drew up plans which call for the straightening of the river channel, with levees on either side to prevent further channel changes, and the building of a dam which will create a reservoir for storing water during the flood season with suitable provisions for the handling of an enormous amount of silt carried by the river. Work on the American side started in May 1934, and will require three years to complete. Excavation involved in carrying out the plans is estimated at about 13,000,000 yards. For the United States, the International Boundary Commission, American section, with headquarters at El Paso, is doing the work with six Diesel powered draglines. Five of the machines are of P&H manufacture, ranging in size from 1½ yards up to 3 yards. The sixth machine is of Bucyrus-Erie manufacture, shown below, building a levee along the American side of the river near McNary, Hudspeth County. This machine, Class III, carries a 3-yard bucket on 105-foot steel and aluminum boom, and is powered by a five-cylinder Diesel Fairbanks-Morse engine.

Standard Dredging Co., New York City, was low with a bid of $155,654 for dredging approximately 2,726,000 yards of material in the Galveston Channel.

South Dakota Notes

By LISLE REESE

The State Highway Commission has announced the following awards: **Martin Joyce**, Brandon, $21,916 for surfacing 4.4 miles of road in Brookings County, and $20,148 for 2.2 miles of grading and surfacing in Kingsbury County; **G. W. England & Son** and **Trottman Bros.**, Rapid City, $37,415 for 5.6 miles of grading and $49,561 for 14.7 miles of paving in Pennington County; **Jarvis, Wright & Howell**, Sioux Falls, $24,532 for 10.9 miles of grading in Hutchinson County and $19,279 for 7.2 miles of grading in Miner County; **Western Asphalt Paving Corp.**, Sioux City, Iowa, $223,264 for 8.54 miles of concrete paving in Moody and Flandreau Counties; and **Inland Construction Company**, Omaha, Nebraska, $38,550 for 19 miles of gravel surfacing in Shannon and Bennett Counties.

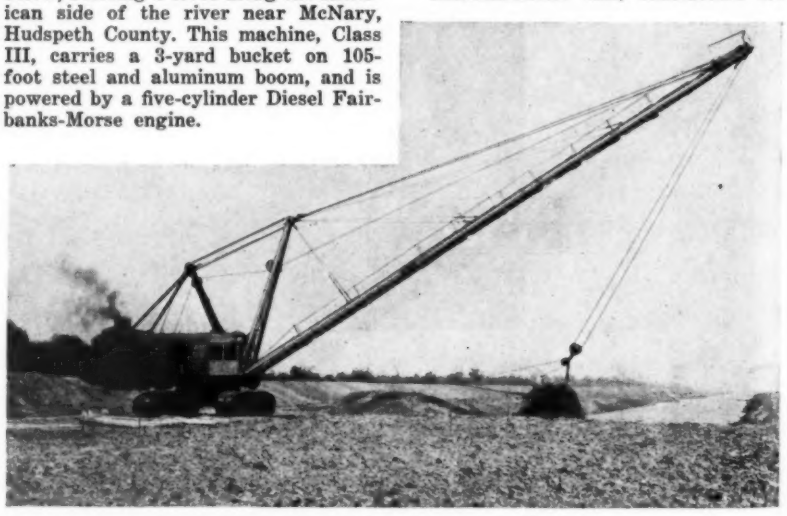
Fort Peck Dam Notes

Government dredging operations were started April 14 with one dredge. By April 30, all four of the 28-inch hydraulic dredges were in place, and after a week or so of "limbering up", had obtained a total output of about 120,000 yards per day of 20 hours average. The huge dam will require approximately 100,000,000 yards of fill.

Mason-Walsh Company holed through No. 4 pilot tunnel April 22. All four pilot tunnels, totaling 25,268 linear feet, are now complete. The work of enlarging the four tunnels to the required size will be started at the downstream portals as soon as the open-cut section of the tunnels are completed.

Massman Construction Company moved 265,000 yards of dirt on their portion of the spillway during the week of May 1 to 7 inclusive with twelve power shovels in operation.

Addison-Miller Inc., contractors for



DREDGE profits come from big output. Bucyrus-Erie dredges are famous the world over for steady, dependable output through long years of service. They are built for hard digging . . . that means faster going and lower operating costs even when excavating in easily handled materials.

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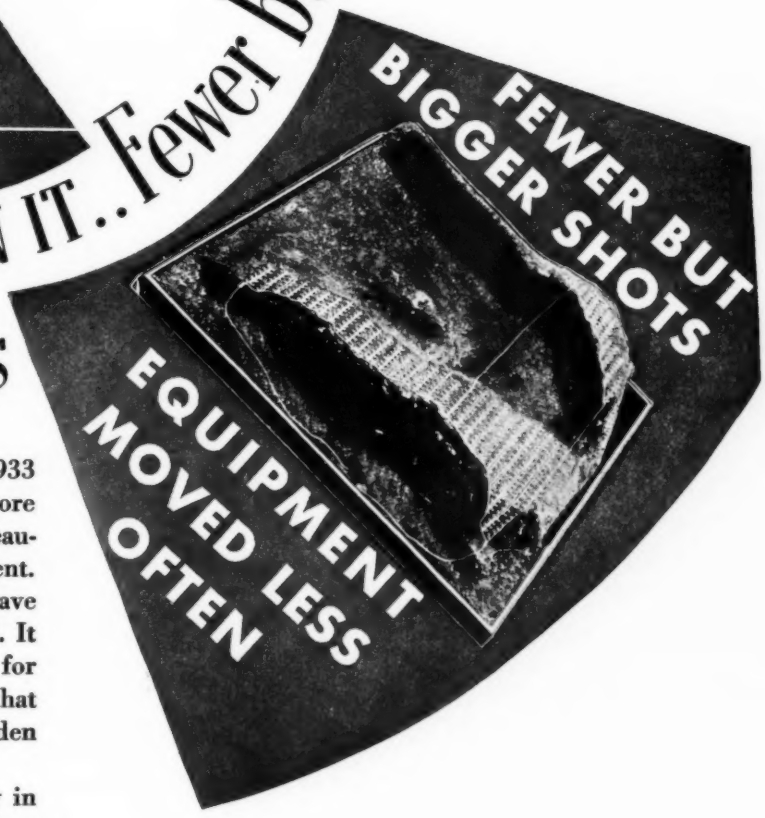
YES WE MEAN IT.. Fewer but Bigger Shots



Manistique made history in 1933 with a giant blast comprising more than 4,000 six-inch holes. Cordeau-Bickford was the detonating agent. It carried a powerful detonating wave to every cartridge in each load. It also provided a *positive* hook-up for all holes in a planned rotation that resulted in successive relief of burden —and better fragmentation.

Bigger shots also save money in time, in labor, and in wear and tear on machinery and equipment. With shots planned to include groups of holes, drilling can proceed without the frequent interruptions that accompany small blasts. Equipment can remain on the scene until all holes are drilled, instead of being repeatedly removed or covered to make way for smaller shots.

Yet bigger blasts—fewer, more economical and more profitable blasts—are only one way in which Cordeau-Bickford saves money . . . Learn about its other cost-saving features. THE ENSIGN-BICKFORD CO., *Simsbury, Conn.* Estab. 1836.

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DETONATING FUSE
BICKFORD
ALSO SAFETY FUSE *Since* 1836

THE ENSIGN-BICKFORD COMPANY

CB-43

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Shots From the Firing Line— *Continued*

the spillway gate and cut-off structure, have been given formal notice to proceed with their work. They have already started preliminary excavation.

Bonneville Dam Notes

Columbia Construction Company, Bonneville, Oregon, was low with a bid of $247,500 for the excavation of the lower rock approach to the locks and the fishway being built in connection with this project.

A handy piece of equipment to have around a construction camp these days is a portable arc welder. Shown below, the operator is welding together lengths of pipe by means of a P&H Hansen Arc Welder.

Grand Coulee Dam Notes

By GRACE KIRKPATRICK

The huge coffer-dam, constructed by **Mason-Walsh-Atkinson-Kier,** on the west side of the Columbia River will receive its initial test the latter part of June when the river is expected to reach its maximum flood stage. It is reported that word has been received from Canada which states that snow conditions everywhere are above normal. The run-off is expected to be considerably above average. At Grand Coulee a flow of 450,000 cubic feet per second or about 100,000 more than average is considered likely.

Excavation is still being pushed vigorously. The illustration above shows one of MWAK's Bucyrus-Erie 120-B electric shovels loading to two 13-yard Athey dump wagons, in tandem, pulled by a Caterpillar Diesel 75.

California Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the California Division of Highways: **United Concrete Pipe Corporation,** Los Angeles, $24,911, for .06 miles grading and surfacing in Ventura County; **Fredrickson & Watson Construction Company,** Oakland, $129,908, for widening the undergrade crossing under the S. P. tracks and the South San Francisco Belt Railroad at South San Francisco; **J. E. Haddock,** Pasadena, $39,633, for reinforced concrete girder bridge across Trabuco Creek in Orange County; **Heafey-Moore & J. A. Casson,** Oakland, $89,977, for 3.8 miles of grading and asphalt paving in San Joaquin County; **E. A. Forde,** San Anselmo, $15,561, for 1.3 miles of retread surfacing in Mendocino County; **Griffith Company,** Los Angeles, $60,923, for .6 miles concrete paving in Los Angeles County; **Barrett & Hilp,** San Francisco, $1,026,780, for overhead crossing over the tracks of the Santa Fe Railroad, Southern Pacific Railroad and Key System in the city of Oakland; and **Daley Corporation,** San Diego, $45,437, for 2.8 miles of grading and paving in San Diego County.

Macco Construction Company, Clearwater, California received an award for the construction of the Coyote Creek Dam and spillway for $493,825 from the Santa Clara Valley Conservation District. The Dam, which will be located on Coyote Creek, five miles east of Morgan Hill, will be a combination earth-fill, gravel-fill and rock-fill type, 900 feet long at crest, 120 feet high, with a storage capacity of 30,000 acre feet.

Mittry Brothers, Los Angeles, are engaged in the construction of 2.7 miles of new highway which will connect the town of Half Moon Bay with the Sky Line Boulevard running out of San Francisco. The illustration below shows two of their Le Tourneau Carryall Scrapers, pulled by Caterpillar Diesel 75's, and a Bulldozer making a fill on a section of the new highway.

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Trade Mark Reg. U. S. Patent Office
11-13½% Nickel Manganese Steel
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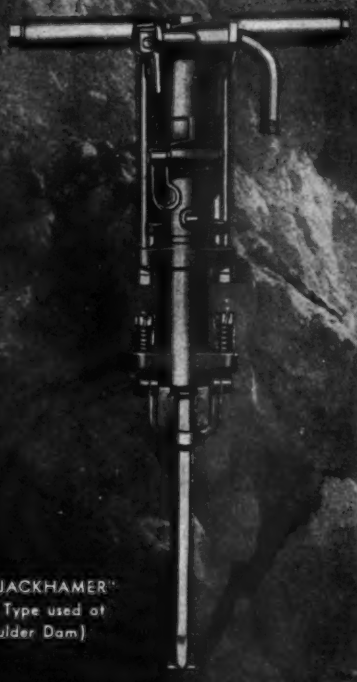
A "Jackhamer" Man at Boulder Dam Writes

"I HAVE been a "Jackhamer" Man on this project for better than 18 months and I have yet to have an Ingersoll-Rand "Jackhamer" go bad on the job and that's 8 hours a day — every day."

Thank you Mr. "Jackhamer" Man.

There is nothing extraordinary about this testimonial for "Jackhamer" Drills are doing this year in and year out, not only on such world famous projects as Boulder Dam, but also for the short-time contract, the roadbuilder, and in the mine and quarry.

There are six sizes of "Jackhamer" Drills — ranging in weight from 26 to 75 lbs. — and three hand-held sinkers. Included in this family of "Jackhamers" is a drill exactly suited for every down-hole drilling condition encountered in contracting, roadbuilding, quarrying, and mining. You name your drilling conditions and we'll name the correct size "Jackhamer."



S-49 "JACKHAMER" (The Type used at Boulder Dam)

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121-5

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Shots From the Firing Line— *Continued*

The material being handled on this $149,800 contract is a hard sticky clay.

The Orange County Board of Supervisors have asked P.W.A. for **$11,600,000 to build a large dam** at Prado, California and to enlarge the San Diego Dam. A number of flood control dams will also be built in San Juan, Trabuco, Aliso, Brea and Carbon Canyons.

The Bureau of Public Roads, San Francisco, have awarded two contracts to the **Peninsula Paving Company**, one in the amount of $69,431 for 28.07 miles of bituminous surfacing in Modoc County and another for $34,703 for 12.45 miles of bituminous surface treatment in Siskiyou County.

Griffith Company, Los Angeles, are relocating the Grapevine Road south of Bakersfield. Shown below, their Bucyrus-Erie 43-B Diesel shovel loads a Mack truck.

Los Angeles and Vicinity

By K. CAMPBELL

L. E. Dixon, Bent Bros. and Johnson started work recently on the last bore of the Figueroa Street tunnel which will open a new highway from the northeastern portion of the city to downtown Los Angeles. The contract was awarded by the Board of Public Works at a bid price of $366,607 and work is to be completed within 300 days. H. J. King is tunnel superintendent of this as well as the Pasadena tunnel now being excavated by that company. The bore will be 755 feet long, with a roadway of forty feet and one five-foot sidewalk. The tunnel sides will be lined with glazed white tile to a height of seven feet above the sidewalk.

Bids are soon to be advertised by the Board of Public Works for the **viaduct which will span the Los Angeles River.** It is estimated this will cost in the neighborhood of $900,000.

Bids are to be received soon at Santa Monica for the **building of a viaduct** across Santa Monica and Rustic Canyons at an estimated cost of $500,000.

More than 35 percent of the $1,000,000 dredging project has been completed to date, according to Mr. Rohl, of **Rohl-Connolly Company**, contractor for the jetty extension in Los Angeles Harbor. It is anticipated that the job may be finished two months ahead of schedule.

The Macco Construction Company has completed the placing of rock on the crest and slopes of San Gabriel Dam No. 2. Approximately 63,000 yards of rock were needed to compensate for the settlement in the structure which began after the flood of January 1, 1934. Construction of the temporary wooden facing for the dam is still under way by the **Case Construction Company.** After the wooden face is completed, the dam will be allowed to stand for two or three more years to make sure that all settlement has ceased before a permanent new concrete facing is constructed.

All-American Canal Notes

By H. L. LIVINGSTON

Bids were opened April 25 on an additional 20 miles of canal extending west from W. E. Callahan Construction Company's contract. **Lewis-Chambers Construction Company, Inc.**, New Orleans, was low with a bid of $505,506 on schedules 1, 2 and 3, with 7,789,000 yards of excavation involved. **Mittry Brothers**, Los Angeles, submitted low bid of $260,400 on Schedule 4, with 3,472,000 yards of excavation.

Colorado River Aqueduct Notes

By K. CAMPBELL

H. J. King, general superintendent for **L. E. Dixon, Bent Bros. and Johnson** announces that the crews working on the Pasadena tunnel have broken the world's record for that size tunnel in drilling 1,542 feet in the past 31

HAYWARD BUCKETS
PLAY SAFE . . . CHOOSE HAYWARDS
Hayward Buckets won't fall down on the job, cause time out, or require costly repairs.
THE HAYWARD COMPANY
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Per Pound of Trailer!
LaCrosse Tu-Way Trailers eliminate the unnecessary weight of the gooseneck. This means more pay load, and less power consumed by the truck.
Tu-Way Trailers pull from either end, load from either end or side, steer from either end and have brakes on all wheels controlled from either end. Mounted on the new small diameter pneumatic tires they have a low loading platform and conform to State regulations. Ask for literature.
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Long Range Digging at Lowest Cost
For digging in rivers, ponds or deep pits—use a SLACKLINE CABLEWAY. For cutting down a hill, making a fill, building a levee or earth dam, digging a canal—use a CRESCENT SCRAPER.
SAUERMAN BROS., INC.
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One man Excavators handling 10 to 600 cu. yd. per hour. Spans from 200 to 1500 ft.
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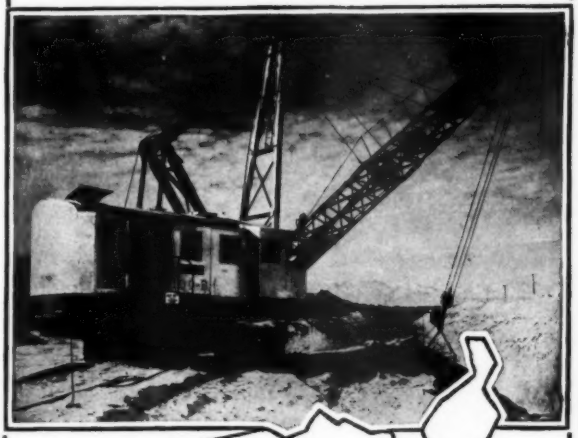

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Whether your shovels are at work in Pennsylvania's anthracite fields or in the copper mines of Colorado . . . they are always within over-night distance of *Westinghouse Service.*

Westinghouse service shops, 36 in all, are strategically located throughout the country. Manned with factory-trained experts and equipped for speedy, efficient work, they are ready day or night to make repairs when you need them most.

Remember, when you buy *Westinghouse* electric shovel drive, you not only get equipment that is built for tough jobs . . . you also know that expert service is never more than a few hours away.

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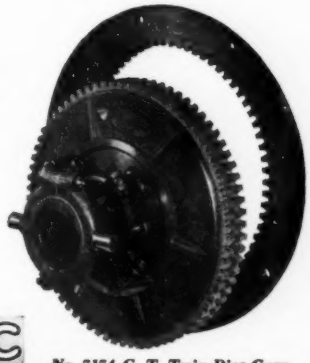
ELECTRIC SHOVEL DRIVES

287 cu. yds. per hour

Straightening a road at Kingsville, Md., this 1¾ yd. Marion Type 371, a new clutch type excavator, in nine hours loaded 304 crawler wagons with an average capacity each of 8½ cu. yds. bank measurement. That's shovel performance! And clutch performance, too. The Marion Steam Shovel Company says: "The Twin Disc Clutch was selected for this type of Marion shovel after many tests for reliability and efficient operation, and this clutch has simplified the design and been found to be very satisfactory." Twin Disc Engineers will send you engineering data, or specific recommendations, on request.

Twin Disc Clutch Company, 1335 Racine St., Racine, Wisconsin.



TWIN DISC CLUTCHES

No. 7174-G. T. Twin Disc Gear Tooth Clutch.

Shots From the Firing Line— *Continued*

days. "We showed 'em who had the best crew along the line," King commented.

Work has been suspended indefinitely on Parker Dam following a ruling by the United States Supreme Court that Arizona had a right to interfere and object to construction of same. The decision, written by Judge Butler asserted that the dam project had never been authorized by law. This cannot be done, according to the decision, until the consent of Congress has been obtained and the plans shall have been approved by the Chief of Engineers, U. S. Army, and the Secretary of War, as the Colorado is maintained to be a "navigable river." Such regulations, according to the Court, apply not only to private parties, but to Federal and State officers. Mr. Weymouth, Chief Engineer for the District states that another diversion point will be selected and water will be taken from that point for the Aqueduct, or in some way the water will be pumped out of the river without regulating it by means of a dam.

Progress on the Monrovia Tunnel, being drilled by the **West Construction Company**, has been slowed up somewhat by virtue of the fact that they have struck water in the tunnel. The

road has not yet been completed by this company into Fish Canyon, but they expect to commence drilling within a couple of weeks.

Good progress has been made by **Winston Brothers** on their Iron Mountain Tunnel job. Shown here is one of their two Bucyrus-Erie electric tunnel shovels at work in the west heading. An interesting output record has been attained by this machine. Up to November 1, 1934, this shovel has handled 62,000 yards of muck. The west heading has advanced at an average rate of 7.4 lineal feet per 8-hour shift with an average mucking time for the shovel of three hours and 29 minutes.

For Bigger Yardages Quicker

LeTOURNEAU EQUIPMENT

You can move more yards, move them faster and consequently more profitably with Le Tourneau Equipment. Jobs .... tough jobs from Bonneville Dam to Rhode Island .... prove that.

These two are typical:

60 Loads in 90 Minutes! — That's what three Super Carryall Scrapers, (above), working on a highway contract

for Chas. Weaver of Memphis, Tenn., are delivering on a round trip haul of 1000 feet.

25 Yards per Load on the Mississippi Levee—This Le Tourneau Buggy (left), pulled by a 75 h. p. tractor, delivered 37 loads of 25 yards each in 9 hours on a 1650-foot round trip haul, 150 feet of it over a 10% ramp. Sticky, heavy gumbo, but big, low pressure tires kept the Buggy rolling.

Ask for DATA SHEET PROOF — Write our Engineering Department, describing your dirtmoving problems—we will gladly tell you how Le Tourneau Equipment has whipped similar jobs for others.

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Manufacturers of: Angledozers, Bulldozers, Buggies, Carryall Scrapers, Derricks, Rooters, Sheep's Foot Rollers, Power Control Units.

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Lower Quarry Floor to Cut Costs

(Continued from Page 280)

Amiesite, to this single market.

Another increasingly important product of the plant is rock dust. These fines from the last deck of the vibrating screens finds some market as a filler for fireproof composition roofing shingles, and for special types of paints.

On our way to the exit from the quarry we "pass in review" the entire plant layout. Leaving the site smoothly graded by the GA-2 shovel for additional stock pile area, we pass heaps of stone and an Industrial-Brownhoist locomotive crane which has placed them there. Beyond is the Amiesite plant and as we leave this we dodge a Vulcan steam locomotive pushing a train of four-yard side-dump cars loaded with stone from the crushing plant a hundred yards away. Beyond this plant the shops are strung out: First a low shed housing supplies and the electrically driven compressor which supplies air for secondary drilling and for drill sharpeners; then the garage and repair shop where the truck equipment is kept in shape; beyond, a newly-built shop housing all drill sharpening operations. Here the end of the quarry face cuts off our view of the powder house; behind this ridge, two tanks hold gasoline and fuel oil in tank-car lots. Finally, at the scales and quarry office, we say good-bye to Mr. Dotter, with many thanks for his courtesies and information, and best wishes for success and lower costs on the new quarry level.

● *The screening plant, housing 5 vibrating screens as well as a labyrinth of chutes and belts, can produce 75 different sizes and specifications of stone. The Plymouth dinky transports stone from here to the Amiesite plant and the stockpiles.*

● *Another view of the 75-B shovel in the new pit with the 100-B working above on the old floor.*

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REG U. S. PAT OFF
LUBRICANTS

Resist RAIN and MUD
HEAT and DUST

UNEXCELLED FOR EXCAVATING, HANDLING AND ROAD BUILDING EQUIPMENT

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Gredag Lubricants develop graphitic bearing surfaces, pressure, heat and water resistant, which insure an unbroken film of lubrication under the most severe operating conditions.

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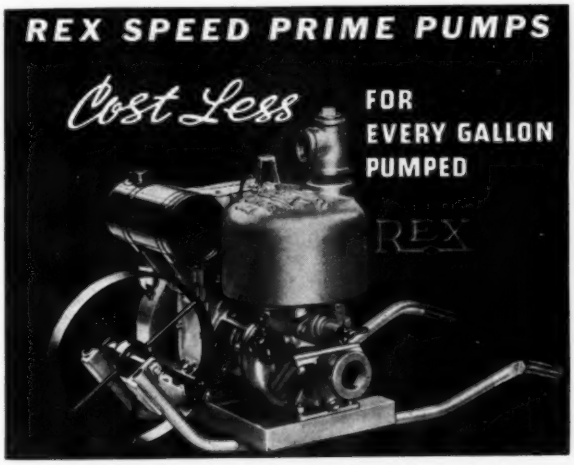
Cost Less FOR EVERY GALLON PUMPED



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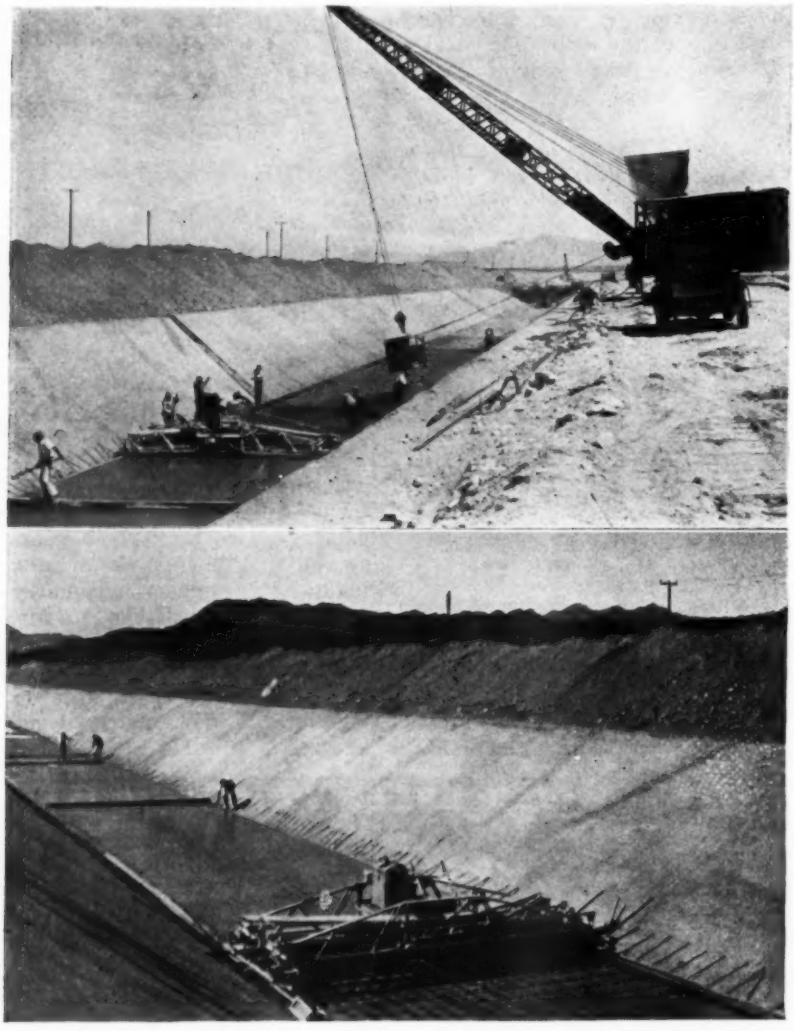
Open Cut on the Aqueduct

(Continued from Page 276)



● *Top: A Link Belt crane swings the concrete from the mixer on the bank to the floor of the canal. Below: The Lakewood finisher certainly turns out a beautiful floor.*

the District as the concrete will be vibrated after placing.

A special machine for vibrating the concrete along the sides is now under construction at the Emsco Derrick and Equipment Company's plant in Los Angeles. Former methods used a V-shaped sled which was drawn up the bank, the concrete being fed in front of it. Now mechanical vibrators will be added together with a reciprocating screed.

Portable Transformer Substation Cuts Moving Costs

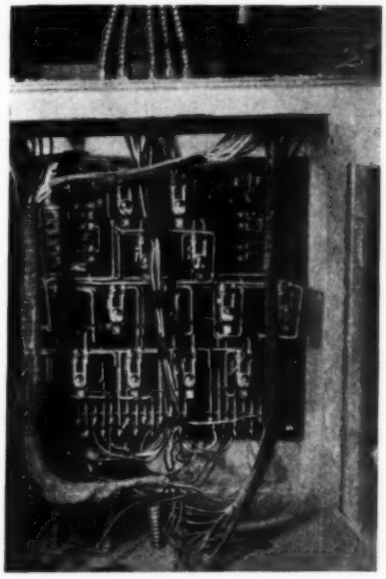
Electrician Carr had some interesting information about the portable substation which feeds power to the electric dragline. The substation consists of three 100-KVA transformers, 33000/2200 volts, with the necessary air-break switches, oil circuit-breakers, meters, and insulators, all compactly mounted on a flat-bed 5-ton trailer of suitable size. This, he said, constituted one of the best features of the job. The substation for the Bucyrus-Erie 120-B, for example, runs the excavating cost up only 3 mills per yard of dirt moved, while a pole line would have increased the cost about 1 cent per yard. The cost of moving the substation as the dragline progresses is considerably less than that of installing one pole. It takes approximately one hour to disconnect the substation, move 2400 feet, move the dragline cable, and hook up again. A tractor pulls the substation to its new location along the District's 33,000-volt line paralleling the canal. The cost of disconnecting, moving up, and reconnecting runs about $10. The substation is disconnected from and reconnected to the "hot" power line by one of the District's patrol crews. The cost of pole line in the desert runs from $1000 to $1200 per mile, so it would seem that the movable transformers are very practical. Barrett-Hilp-Macco, and Wood and Bevanda are other contractors on the Aqueduct using this type of mobile transformer.

Originally there were only 1,000 feet of cable from the transformer bank to the dragline, and only 1200 feet of ditch could be excavated before a move became necessary. With an addition of 400 feet of cable, 1400 feet in all, the range of the 5-yard dragline, with one hook-up, has been increased to 2,000 feet.

While schedule 10, with the exception of the 11 siphons, is all open canal, the 4 schedules on which the Aqueduct Construction Company was successful bidder include practically all types of open construction ranging from cut-and-cover conduit to round pressure pipes.

Schedules Nos. 1, 10, 11, and 13 embrace about 20 miles of open canal, 5 miles of cut- and-cover

● *Modern Riders of the Purple Sage—Ben Brown, Electrician; Tom White, Oiler; and Forest Jacobs, Operator.*



● *The "brain" of the control system automatically regulates the weighing of the aggregates.*

conduit, and 3 miles of siphons. The following table shows the amounts of excavation and concrete involved in the first two items (canal and conduit).

● *The business end of the 120-B carries the boom suspended from a masthead. This design, Bucyrus-Erie engineers state, reduces compression loads in long boom structures.*

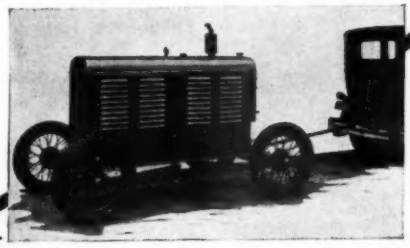
Schedules	1	10	11	13
Canal				
Length in feet.....	0	39,615	34,045	29,195
Yds.—Exc.	0	787,000	677,000	634,000
Yds.—Concrete	0	56,910	49,050	42,060
Conduit				
Length in feet.....	20,325	0	3,187	1,005
Yds.—Exc. 985,000		0	161,200	40,100
Yds.—Concrete	84,000	0	13,160	3,850

Excavation for the various siphons (33 sections involved) called for on the 4 schedules, and totaling 3.207 miles in length, amounts to 437,800 yards. 43,170 yards of concrete are required.

The total amount of excavation involved is approximately 3,800,000 cubic yards, of which some 700,000 have been excavated to date. The four schedules also call for the pouring of approximately 292,000 yards of concrete.

Located about 18 miles east of Desert Center, California, the Aqueduct Construction Company's camp is about 6 miles east of the Coxcomb tunnel and the Winston Bros. camp. This camp will serve for schedule 10 only. The camp for schedule 1, farther east near Whipple Mountain tunnel, is now under construction.

To the Rescue!



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ARC WELDER

Machinery and equipment disabled on the job costs money! That's one reason why a P&H-Hansen Trailer Mounted Welder pays for itself—repairing broken parts, rebuilding worn parts, fabricating new parts by this faster, simpler method. Use it also for fabricating bridges, culverts, tanks, etc.

With its uniform current and simplified control, P&H-Hansen gives you arc welding at its best. Ask for Bulletin HW-3.

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BACKED BY 50 YEARS OF EXPERIENCE

This Trademark
Gatke
means
Quality Safety Economy

You Can Get It
on Every Type of Friction

GATKE — Asbestographite Brake Blocks and Frictions are moulded in any size and shape to machined perfection. Made for every type of brake, friction, and clutch . . . do away with adjustments, slipping, and sticking . . . prevent wear and tear, and increase efficiency of equipment. Send your brake and friction problems to Gatke.

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EXCAVATING ENGINEER Bargain Counter

★ ★ ★ **THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.**

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE—4-cylinder 7¾"x9" Twin City gasoline engine and 1½ cu. yd. Omaha bucket. SCD-20.

MEAD-MORRISON GASOLINE COMBINATION SHOVEL-CLAMSHELL. ½ cu. yd. Dipper, 17' Dipper handle—18' Boom—32' Clamshell Boom and ½ yard Erie Clamshell Bucket. 5"x6" 4-cyl. Wisconsin Engine. Good mechanical condition. Bargain Price. SCD-28.

BAY CITY "PUP" GASOLINE CLAMSHELL. Good mechanical condition. SCD-24.

BYERS "BEARCAT" Gasoline ⅝-yard Shovel. Hercules engine. Overhaul. Good mechanical condition. SCD-25.

THEW-UNIVERSAL MODEL 35 — Gasoline — ½ cubic yard standard shovel equipment—25' lattice type crane boom and ½ yard Williams bucket with teeth—complete drag shovel attachment and skimmer scoop bucket, including home-made trailer. Excellent condition. SCD-26.

BUCYRUS-ERIE MODEL 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

COMPLETE FRONT END EQUIPMENT

Shovel Equipment

⅝ CU. YD. DIPPER—20' boom—13' Dipper Handle—rope crowd shovel equipment. Suitable for models 1030 or 1035. NEW. SE-1.

⅝ YARD PLATE DIPPER, 19'9" BOOM, 18'4" DIPPER HANDLE—Shovel equipment suitable application Bucyrus-Erie B or B-2. Good condition. SE-29.

¾ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Gas or Diesel. NEW. SE-15.

¾ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. NEW. SE-17.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. NEW. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24.

1 CU. YD. DIPPER—23' BOOM—12'6" Dipper Handle—Rope crowd shovel equipment. Suitable for D-2 machine. NEW. SE-4.

1 CU. YD. DIPPER—24' BOOM—18' DIPPER HANDLE—Slightly used but good conditioned. Suitable for any Bucyrus-Erie GA-2 or GA-3 Machine. SE-25

1 CU. YD. DIPPER—24' BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-26.

1¼ CU. YD. DIPPER—22'6" BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-27.

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. **New Machine Guarantee.** SE-5

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. **Rebuilt—New Machine Guarantee.** SE-23.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. NEW. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. NEW. DL-3.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2—41-B—42-B. NEW. DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2—41-B—42-B. NEW. DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on 30-B Diesel Steam and Electric. NEW. DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel Steam and Electric. NEW. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Trench Digging Equipment

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. Rebuilt—New Machine Guarantee. DS-5.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD 42½" WIDE SOLID TYPE DIPPER—24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. **Rebuilt—New Machine Guarantee.** DS-8

BRAND NEW Ropes included with each of above Trench Digging Equipments.

Skimmer Scoop

⅝ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. NEW. Shipment 2 to 3 weeks. SS-1.

Address all inquiries to Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. NEW. D-12.

1 2 3 CU. YD.—Plate front.—Will fit 14-B. NEW. D-13.

2 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. NEW. D-15.

3 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. NEW. D-16.

2 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. NEW. D-18.

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Slightly used. D-36.

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. NEW. D-37.

1 ⅞ CU. YD.—Plate front.—Will fit 18-B. NEW. D-20.

1 ⅞ CU. YD.—Rock type.—Will fit 31-B. NEW. D-21.

1 CUBIC YARD MANGANESE DIPPER. Will fit Bucyrus-Erie B-2 or GA-2. Good condition. D-40

1 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2, 41-B or 42-B. Slightly Used. D-26.

1 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2—41-B—42-B. NEW. D-27.

1 1¼ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 37-B. Slightly used. D-38.

1 1½ CU. YD.—PLATE.—Will fit E-2. NEW. D-28.

1 1½ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 43-B. Slightly used. D-39.

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly used. D-29.

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30.

1—¾ CU. YD. ALL CAST ROCK 20-B TUNNEL. NEW. D-41.

1—1 CU. YD.—Plate Front—20-B. NEW. D-42.

1—1¼ CU. YD.—Cast Front—E-2, 41-B. USED. D-43.

2—1¼ CU. YD.—Manganese Front—Inserted Teeth—E-2, 41-B, 42-B. NEW. D-44.

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C machines. NEW. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. NEW. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. NEW. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. NEW. D-5.

3 6 CU. YD. Molybdenum Steel Front. Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. NEW. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly used but excellent condition. D-6.

PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge—bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

DRAGLINE BUCKETS

NEW

1 ¾ CU. YD. PAGE CLASS "C". Approximate weight each 2425 lbs. DB-1

3 2 CU. YD. PAGE CLASS "C." Approximate weight each 5630 lbs. DB-4.

3 2¼ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3850 lbs. DB-13.

4 2½ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 4600 lbs. DB-14.

1—5 CUBIC YARD HEAVY DUTY—approximate weight 12000 pounds. Item DB-16

1—6 CUBIC YARD TYPE W MONIGHAN BUCKET—approximate weight 12500 pounds. Item DB-17

1—7 CUBIC YARD TYPE W MONIGHAN BUCKET—approximate weight 13700 pounds. Item DB-18

REBUILT

1 2 CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3200 lbs. DB-12.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Approximate weight 6500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Approximate weight 5400 lbs. DB-10.

USED

1 1 CU. YD. PAGE BUCKET. DB-20.

1—6 CUBIC YARD TYPE W MONIGHAN—approximate weight 12500 pounds. DB-19.

ELECTRICAL EQUIPMENT

90 H.P. MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM. NEW EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 75 H.P. induction motor, 3 phase, 60 cycle, 440 volt, connected to 50 KW, 250 volt—1200 RPM Generator, includes suitable rheostat and compensator. NEW. EE-2.

75 H.P. COMPENSATOR—GENERAL ELECTRIC—2200 volt, 3 phase, 25 cycle, manual type. NEW. EE-3.

5 KVA TRANSFORMER—GENERAL ELECTRIC—2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. NEW. EE-4.

125 KW GENERATOR—WESTINGHOUSE—250 volts, 500 amperes, Direct current. 440 RPM. Includes two outboard bearings. NEW. EE-5.

CLAMSHELL EQUIPMENT

50' BOOM CLAMSHELL EQUIPMENT including front drum and gearing but not including ropes. Practically new condition. Can be applied to Type B or B-2 machines. CS-1.

LOCOMOTIVES

3 24-INCH GAUGE 3-TON BALDWIN GASOLINE LOCOMOTIVES, Model AL, Type 2. Price very favorable. L-1.

TRAILERS

1-14 TON WILLIAMS "ECONOMY" TRAILER. Arch Girder Construction—Safety Chains—Rear Loading ramp. Solid Rubber tired wheels 28"x10" front 28"x16" rear. Deck dimensions 12'x7'9"x31½" high. NEW. T-1.

ROAD ROLLERS

1 10-TON BUFFALO SPRINGFIELD GASOLINE ROLLER with scarifier. About three years old. Splendid condition. Very favorable price. RR-1.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2—150 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—6 cylinder, 9" bore x 10½" stroke, 450 R.P.M., 4 cycle, vertical overhead valves, dust proof, oil tight crank case and forced lubrication. Includes auxiliary air starting equipment. DE-2.

1—45 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINE—4 cylinder, 6" bore x 8" stroke, 650 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-5.

3—110 H.P., NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—6 cylinder, 7" bore x 8½" stroke, 600 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-6.

Gasoline

1 MODEL HH-U NOVO—16 H.P. ENGINE—4-cylinder, 3⅜"x4"—1200 R.P.M.—Radiator cooled—complete power plant—mounted on channels—sheet metal housing—extended crank shaft 1⅞" diameter, including outboard bearing with Fafner ball bearing. GE-1.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 H.P. at 400 R.P.M. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 H.P. at 400 R.P.M. 100 lb. Pressure. ME-3.

1 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

BOILERS

NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box, ASME Std. Will fit any B-2 or B-3. B-9.

1 54"x100"—64 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

2 42"x88"—35 H.P. 144 lb. working pressure. Mass. Std. Will fit type B. B-17.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

2—70"x12'—136 H.P. 175 lb. working pressure. ASME, and Mass. Std. Will fit 120-B. B-18.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure. A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M.—Overall dimensions: Height 45"—length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with with fittings. NEW. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

Not in the Contract

DRAWING BY FRANK BEAVER—COURTESY THE PARENTS' MAGAZINE

Cartoon Without Words

Mechanics Prof: "Describe the mechanism of a steam shovel."

Frosh Engineer: "Don't kid me. You can't carry steam on a shovel."

Liza: "Yo' oughta count yo'sef again, big boy; yo' ain't so numerous."

Mose: "Stick a thermometer in yo' mouf; yo' ain't so hot."

June Rhapsody

By Stanley Donaldson

It's hot today. The bucket cuts
A mighty glarey slope.
There's heat waves on the spreader bar;
They dance along the rope.

The fairlead sheaves are rollin' dark
Against a world of light.
It's hot enough for August now. . . .
THAT BACKHAUL CLUTCH AIN'T RIGHT!

The man that boils the water out
And makes this demon roll
Has ninety feet of stack today
And devils in the coal.

The gear dope spread at Easter time,
The oil we used till May,
The grease inside the diggin' drum
Is back with us today.

I have to think of what I'm at,
But want to think of things
Not meant for dragline men this year. . . .
THAT RAM IS FULL OF SPRINGS!

Of all the oilers I have seen
This oiler now, he wins!
There's lu-bri-cant along the deck
And on the gantry pins!

I wonder who will flog this wreck
When I have got my fill?
I wonder who will wear her out
When I am on the hill?

I had a girl at Greenville town,
A girl to dream about;
I thought that I was fixed for girls
—and then the jack ran out!

Last fall it seemed that winter was
A curse to digging lands;
It's welcome now, for all it takes
The pay check from my hands.

I know that jobs are hard to find,
I know the times are tough;
But I'd like to go to Greenville town
And see if love's enough!

The manager of the restaurant stormed down the room between the tables and grasped the waiter's arm.

"Why did you turn that diner out?" he asked.

"He wasn't sober, sir," replied the waiter calmly enough.

"Wasn't sober?" echoed the manager. "And how did you know?"

"Easy, sir," replied the waiter. "He put his newspaper in the ring and read his table-napkin."

"Do you still send your shirts to the laundry?"

"No, I just wear 'em once and tear 'em up myself.

"Has your husband taken the medicine I prescribed? A tablet before each meal and a small whiskey after?"

"Mebbe he's a few tablets behind, but he's months ahead wi' th' whiskey!"

Tessie: "If you were me, Marie, would you accept Jimmie?"

Marie: "If I were you, dearie, I'd accept any one."

Foreman (to small son of workman who has met with an accident): "When will your dad be fit for work again?"

Boy: "Can't say for certain, but it won't be for a long time."

Foreman: "What make you think that?"

Boy: "'Cause compensation's set in."

A pretty young nurse was selling poppies. A contractor told her that he would give her a $5 bill for a poppy provided she would promise to nurse him if he ever went to her hospital. She agreed.

"By the way," the contractor asked, "where is your hospital?"

"I am at Queen Charlotte's Maternity Hospital," meekly replied the pretty nurse, putting the five spot into the box.

"What is the difference between a bathroom and a cemetery?"

"There is no difference. When you gotta go—you gotta go."

First Dumb Hunter: "How do you detect an elephant?"

Guide: "You smell a faint odor of peanuts on his breath."

Trade Notes

Minneapolis was a mecca for contractors, Federal and State highway officials who came to view the **William H. Ziegler Co. Inc.** Machinery Exhibition April 25, 26 and 27th. Delegations attended from many points in the north and middle west. Thirty-eight manufacturers exhibited several hundred thousand dollars' worth of equipment attractively displayed on the spacious floors of the two largest buildings formerly occupied by the Road Machinery division of Caterpillar Tractor Co. Exhibits covered 30,000 feet of floor space.

On April 4, the New York Office of **Bucyrus-Erie Company** was moved to new quarters on the 36th floor of the RCA Building in Rockefeller Center. Working out of this office, in addition to Eastern Sales Manager J. C. Alexander, are: R. W. Conant, F. Leslie Jones, W. W. Goetz, E. G. Lewis, R. J. Breslin, G. E. Peterson, G. L. Harman, and T. A. Billings. The new telephone number is Columbus 5-4395. Bucyrus-Erie Company, manufacturers of excavating, drilling and material handling equipment, have their general offices at South Milwaukee, Wisconsin.

Frank E. Blanchard, formerly manager of sales, southeastern states, for the Climax Engineering Co., of Clinton, Iowa, has joined **Caterpillar Tractor Co.** at Peoria, Illinois, as a member of the special sales department. Mr. Blanchard had been connected with the Climax Company in sales executive capacity for about 9½ years. He also served as assistant chief engineer and sales engineer in the industrial division of the Buda Company, Harvey, Illinois.

Bucyrus-Erie Company, South Milwaukee, Wisconsin, announces the appointment of **F. C. Crane Company,** 1301 S. Lamar Street, Dallas, Texas, as distributor for the sale of Power Shovels, Draglines, Cranes, Clamshells and Skimmer Scoops in the Central and Eastern territory of Texas. In addition to being able to serve you when in need of excavating equipment from ⅜ to 2 cubic yards capacity, the F. C. Crane Company will carry a complete stock of repair parts for all current machines as well as the older types of small machines. For quick service they may be reached by telephoning 2-6444.

Joseph P. Haley has announced the formation of the **J. P. Haley Company** (a Minnesota Corporation) with offices at 1954 University Avenue, Saint Paul, to engage in general contracting. Mr. Haley was formerly Vice President of Foley Brothers, Inc., and Foley Realty and Security Company.

Bucyrus-Erie Company, South Milwaukee, Wisconsin, announces the appointment of **Louisiana Tractor & Machinery Company, Inc.,** as Loadmaster distributor for the entire state of Louisiana. This new distributor can be reached at 14th and North Boulevard Streets, Baton Rouge, Telephone 5100.

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HELP OF ALL KINDS FURNISHED FREE

The CAMEL

a way to lower haulage costs

Here is a crawler-mounted, self-propelled dump wagon built to stand the hard knocks of shovel loading and operation over rough ground. The strong body in rear dumping position is used to "bulldoze" the load OVER the the edge of the fill, level the floor of the dump, etc. Dual control makes fast getaway possible at the shovel; quick return from the dump.

Capacity 3 to 5 cubic yards.

Write for specifications and prices.

SHUNK MANUFACTURING CO.
105 Auto Ave., Bucyrus, Ohio

Learn how this proven unit can cut haulage costs on your job

A. Guthrie & Company, Inc., have announced the removal of their office, April 29, to 141 East Fourth Street, St. Paul.

Book Reviews

Practical Chemistry — For those whose hobby it is to dabble and putter with chemicals, there is a book of formulae, simply written, that tells you how to make hundreds of useful articles for the shop office or home. The book lives up to its title "Practical Everyday Chemistry" and makes use of many new chemicals and processes developed right up to 1934. It is only necessary to follow instructions. Published by **The Chemical Publishing**

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

OPERATOR

15 years experience on Erie, Keystone and Osgood gas machines. Can do own repair work. Willing to go anywhere in U. S. A. Box 7200.

EXPERIENCED DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

Experienced operator desires work anywhere. Has had 15 years' on dragline work, 4 years' operating clamshell machine and 2 years' on a shovel. Experienced on railroad grading, sand and gravel, and general excavating construction work, principally operating steam machine, but has had three years' operating electric, 2 years' on gasoline and 1 year on Gas+Air machine. Prefers large Bucyrus-Erie any type; steam or electric power. Can furnish best of references from former employers. Age 40. At present located in Western New York. Box 7301.

OPERATOR

15 years experience on gasoline, steam and electric machines. Bucyrus-Erie, Thew and Northwest machines. Prefer operating Bucyrus-Erie. Have worked on highway and railroad grading, quarry, excavation. Willing to go anywhere in U. S. A. Can do all repairing and furnish excellent references. Box 7001.

SHOVEL OPERATOR

Five years' experience on Bucyrus-Erie Gas+Air on basement excavation, highway and street grading. Also eight years experience on Erie, Marion, Bucyrus steam shovels. Will go anywhere. Can do own repairing. A-1 reference. Sober and reliable. Present location Minnesota. Box 7201

OPERATOR—PIT FOREMAN—DRILL FOREMAN

14 years' experience as shovel operator and pit foreman on coal stripping, railroad grading, highway grading, quarry and gravel pit work. Drill foreman on blast hole, tripper rod and air drills. Can operate oxy-acetylene cutting and welding torch. Can do own repair work. Age 41. Can furnish good references. Willing to go anywhere in U. S. A. Now located in Tennessee. Box 7101.

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

Company of 175 Fifth Avenue, New York City, the cost of the book is only $2.00 (foreign countries slightly higher).

Motor Graders—A twelve-page bulletin entitled "Warco Central Control Motor Graders," has recently been published by the **W. A. Riddell Company**, Bucyrus, Ohio. The bulletin contains detailed information and large illustrations showing the Warco motor grader with three types of drive. The machine can be equipped with either the single drive with dual pneumatics, eight-wheel drive, or rear crawler drive. The Warco 15 Roadhog, the Multiplow Mixer and Leveler, and various assemblies and attachments are also illustrated. A copy of the bulletin may be had by writing the manufacturer.

Trailers — An attractive four-page, two-color bulletin, No. 10B-T1, has just been published by the **Bucyrus-Erie Company**, South Milwaukee, Wis., to describe and illustrate their new 10-B trailer, which was designed and built especially for carrying Bucyrus-Erie 10-B excavators from job to job, quickly and economically. A copy will be gladly sent by Bucyrus-Erie Company to anyone requesting it.

Concrete Bridges—A new and enlarged edition of "Analysis of Rigid Frame Concrete Bridges" has been published by the **Portland Cement Association**, 33 West Grand Avenue, Chicago, Illinois. In addition to analysis by moment distribution, a new chart and a new formula are given as basis of a procedure by which moments may be determined quickly without use of frame analysis. This new procedure is valuable for use in making preliminary designs or in checking moments obtained by frame analysis. Copies of this excellent 40-page booklet are available by writing to the Association at the address given above.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Good working condition. Located northern New Jersey. Price very reasonable. Box 643-SS.

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL — 23' boom — 17' dipper handle—1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinty New York. No. 512-SS.

LIMA MODEL 101—Combination 1¼ yard shovel and 40' plus 10' extension Dragline—powered with gasoline engine Model JK 6½" x7"—4 cylinder. Shovel equipment practically new. Located Colorado on C.R.I.&P. Box 599-SS.

THEW-LORAIN 75-B 1¼ CU. YD. gasoline shovel. A-1 condition. Located Texas. Box No. 565-SS.

THEW-LORAIN 75-A combination 1¼ yard Shovel and 50' Boom Dragline including one yard Drag Bucket. Good condition. Located eastern Pennsylvania. Box 610-SS.

BUCYRUS ERIE — So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT

FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ 16-B Shovel-Clamshell. Excellent condition.
- ☐ 37-B Gasoline Chain Crowd Shovel. Excellent condition.
- ☐ Thew Model 35, ½ yd. Sh. Crane, S. Scoop & Trench Digger.
- ☐ Bucyrus-Erie GA-2 Shovel. Rebuilt. New Machine Guarantee.
- ☐ Northwest 45' Boom Clamshell — 1 yd. capacity.

Name.....

Address.....

BUCYRUS-ERIE 1030 GAS, ROPE CROWD SHOVEL. Good operating condition. Located eastern Minnesota. Available for demonstration. Price right for quick sale. Box No. 490-SS.

THEW LORAIN MODEL 75 SHOVEL. 24' Boom, 18' dipper handle, 1¼ cubic yard dipper. Gasoline. Machine now operating. Located central New York State. Box 665-SS.

UNIVERSAL ⅝ CUBIC YARD SHOVEL. 14' Boom, 10' Dipper Handle. Impulse starter. Caterpillar mounted. Very good condition. Located central New York. Box 666-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

MARION MODEL 450—1¼ Cu. Yd. Steam Shovel, Cat Mounted. New Gears on Caterpillar recently installed. Price favorable. 536-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Very good working condition. Located South Carolina. Box 644-SS.

GA-2 SHOVEL, BUCYRUS-ERIE NO. 9918, 22' Boom, 16' Dipper handle, 1 cu. yd. manganese steel front inserted tooth dipper, 20-10 Gas Air single shaft drive, caterpillar mounted, 6¼x8", 4 cyl. Waukesha Motor. Weight 71,900 lbs. Reconditioned. Located Greensboro, N. C. Price $5000.00. Box 595-SS.

BUCYRUS ERIE GA-2 Gas-Air High Lift Shovel—24' Boom, 16' Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat, Electric Starter. Waukesha 4-cylinder 6¼"x8" Gasoline Engine. Reported excellent condition. Located West Virginia. 593-SS.

Drag Shovel

Thew—Universal—Model 35—½ cu. yd. drag shovel complete. Center drive cat. Electric starter. 4 cylinder Waukesha 4½"x6¼" gasoline engine. Also complete ½-yd. shovel equipment and 25' boom clamshell—crane equipment and bucket together with home-made trailer. Box 468-SS.

HEAVY DUTY OSGOOD

Heavy Duty Osgood steam shovel, shop No. 1117, with 20 ft. boom, 15 ft. sticks, 1½-yard bucket; also 28 ft. extra high lift boom, 20 ft. sticks, ¾-yard bucket. Mounted on cats. Boom hoist. A-1 condition. Price F.O.B. on car $3000. Located 85 miles S.W. of Chicago. Box 639-SS.

BUCYRUS-ERIE 35-B ELECTRIC 24' BOOM, 16' Dipper Handle, 1½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

1-YD. STEAMER
BUCYRUS-ERIE 20-B 1-YARD STEAM SHOVEL on crawler tracks. Good condition throughout. Located at Kansas City.
Hobson-McFarland Tractor Company
Kansas City, Missouri

NORTHWEST MODEL 105 SHOVEL. Bargain Price. Located Texas. Box No. 566-SS.

NORTHWEST NO. 4—24' Boom, 16' Dipper Handle, 1 yard Dipper—Gasoline—Located eastern New York. Good condition. Box 600-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50' Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located near Ponca City, Okla. 537-SS.

BUCYRUS-ERIE MODEL 1035—Gasoline, Chain Crowd Shovel, Single Shaft Cat, 26" Treads, Electric Starter, ⅞ Cu. Yd. Dipper. Now operating. Can be demonstrated. Located Massachusetts. 535-SS.

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

GENERAL ½ cubic yard Gasoline Shovel—including 30' Boom Clamshell and Dragline Equipment—New 1931—powered with Buda DW6 High Altitude Gasoline Engine. Excellent condition. Located near Denver. Box 588-SS.

BYERS MASTER SHOVEL — 26' Boom, 17' Dipper Handle, 1¼ cu. yd. Dipper, New January 1931. Good working condition. Located Melvern, Kansas—Highway 75 south of Topeka. Price very favorable. 591-SS.

BUCYRUS-ERIE GA-2 Gas-Air Extra High Lift Shovel—24' Boom, 18'4" Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat. Electric Starter. Excellent condition. Located eastern Pennsylvania. 592-SS.

BUCYRUS-ERIE—42-B Steam Shovel. Caterpillar Mounted, 21' Boom, 15' Dipper Handle, 1½ Cubic Yard Dipper, Power Boom Hoist. This machine excellent mechanical condition. Located Birmingham, Alabama. Can be demonstrated. Box 531-SS.

2 BUCYRUS-ERIE—GA-2—Combination—45' Boom Clamshell—Crane machine and Extra High Lift Shovel equipment. Cat mounted—Self starter—All field rebuilt last year—Excellent condition—Located Eastern Pa. Box 485-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL — 22'6" boom — 16' dipper handle—1¼ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼"x8" engine—New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL: 21' boom, 15' dipper handle, boom hoist, dipper trip, 1¼ cu. yd. Vanderhoef dipper, cat mounting, now located and can be demonstrated at Colchester, Conn. Very favorable price. Box No. 532-SS.

BUCYRUS-ERIE 42-B STEAM SHOVEL—late model, 21' boom, 15' dipper handle, 1½ cu. yd. Vanderhoef dipper, boom hoist, dipper trip. Massachusetts standard boiler, cat mounting. Good operating condition. Now located and can be demonstrated at Colchester, Conn. Box No. 533-SS.

BUCYRUS-ERIE GA-2 Gas-Air High Lift Shovel. 24' Boom, 18'4" Dipper Handle, 1 cubic yard Dipper. Single shaft cat. Air Starter. Waukesha 5¾"x8" four cylinder gasoline engine. Excellent operating condition. Located north of Chicago. Box 645-SS.

BUCYRUS-ERIE GAS+AIR—22' Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, Waukesha 6¼"x8" four cylinder gasoline engine. Single Shaft Cat mounted. First class condition. Located eastern New York. Box 601-SS.

Type "B" Caterpillar mounted, equipped with 19'6" boom, 16' dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

AUSTIN-BADGER TRACTOR SHOVEL. 15' boom, 11' dipper handle, 11 cubic foot dipper. Powered McCormick-Deering four cylinder 4¼" x5" power unit. Trailer included. Good condition except minor repairs. Located western New York. Box 647-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel—Recently overhauled.— Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd. Gasoline Shovel—including 40' boom dragline equipment without bucket. Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wis.

NORTHWEST MODEL 6—1½ CU. YD. SHOVEL—22' Boom, 19' Dipper Handle, Caterpillar Diesel Model D-11000 6-cyl. Engine. Rebuilt early this year. Excellent condition. Located eastern Pennsylvania. Box 547-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' Boom, 15' Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

TWO (2) MODEL 301 STANDARD KOEHRING MACHINES, good operating condition. Now operating and can be inspected in southwestern Ohio. Price, $3,000.00 each. Box 540-SS.

LIMA MODEL 101—1¼ yard Shovel, Waukesha type WL Gasoline Engine. Very favorable price. Located Kansas City, Missouri. Box 598-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' boom, 15' dipper handle, 1¼ cubic yard Vanderhoef front quarry dipper, power boom hoist. Cat mounted. Good condition. Located near Boston. Price very reasonable. Box 604-SS.

BUCYRUS-ERIE GA-2 Gas-Air—Extra high lift 24' boom—18' 4" dipper handle, 1 cu. yd. dipper. Single shaft cat mounting—air starter. Good condition. Located near Hartford, Conn. Box 523-SS.

1 BUCYRUS-ERIE B-2 Steam ⅞ yard High Lift Shovel—Cat Mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

BAY CITY GASOLINE TRACTOR SHOVEL—⅝ cubic yard capacity—including Pull Shovel Attachment. Powered with McCormick-Deering Unit. Located southern Alabama. Box 662-SS.

P&H MODEL 300 SHOVEL—18' Boom, 15' Dipper Handle, ⅝ cubic yard Dipper, manganese front. Powered with Waukesha B U 4½"x6¼" engine, power clutch control. First class operating condition. Located Massachusetts. Box 663-SS.

P&H MODEL 600—1¼ CUBIC YARD GASOLINE SHOVEL. Will be put in good operating condition. Located eastern Pennsylvania. Box 664-SS.

FOR SALE CHEAP

Marion Model 440 Gas Shovel and Dragline, 1 cubic yard capacity. For sale cheap. Located Missouri. Box 634-SS

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

Make an Offer

MARION SHOVELS

—Model 450 Electric Shovel, 1¼ cubic yard dipper and 2 yard plate-dipper.

—Model 450 Electric Combination Shovel and Dragline. ¾ yard dipper, 1 yard dipper, and 1¼ yard dipper, also 2 cubic yard light, plate-front dipper. Boom adjustable 40', 45' and 50'.

—No. 7 Gas-Electric, Combination Shovel and Crane. ¾ yard shovel dipper, 45' crane boom.

—No. 7 Gas-Electric, Standard ⅞ cubic yard shovel. Good condition.

—Model 480 Electric, Combination shovel and dragline. 70' boom and Type X Bucket,—2 cubic yard capacity. Shovel dipper 2 cubic yard. Good condition.

—Model 480 Electric Dragline. 70' boom, 2 yard X Bucket. Good condition.

—Model 490 Electric Shovel. 2¼ cubic yard dipper. Good condition. Box 633-SS

GA-2 HIGH LIFT SHOVEL—24' boom, 16' dipper handle, 1¼ cubic yard dipper, on single shaft cat. Electric starter, Waukesha 4-cylinder 6¼"x8" gasoline engine. Reported excellent condition. Located Virginia. Box 623-SS

GA-2 SHOVEL—22'6" boom, 16' dipper handle, 1 cubic yard dipper, inserted teeth. Rebuilt 1931. Located northern Michigan. Box 624-SS

E-2 DIESEL SHOVEL—26' boom, 15' dipper handles, 1½-yard dipper. Atlas Diesel Engine. Located Massachusetts. Box 615-SS

P&H MODEL 700—1½ cubic yard shovel. Powered with Waukesha 150 h.p. Ricardo head 7½"x8" gasoline engine. Good operating condition. Located New Mexico. Box 652-SS.

43-B GAS SHOVEL—22' boom, 16' dipper handle, 1¾ yard inserted-tooth dipper. Electric starter. Wisconsin 6 cylinder 6x7" engine. Reconditioned—first class condition. Located, New York. Box 617-SS

LINK-BELT COMBINATION SHOVEL—CLAM-SHELL — DRAGLINE — 1½ cubic yard capacity. 22' shovel boom, 16'6" dipper handle, 1½ cubic yard Esco dipper. 40' clamshell-dragline boom and 1 cubic yard Blaw Knox No. 618 clamshell bucket and 1½ cubic yard Esco drag bucket. Powered with Atlas four cylinder 7"x10½" Diesel Engine. Good operating condition. Recently overhauled. Priced right. Box 650-SS.

BUCYRUS-ERIE HEAVY DUTY GASOLINE COMBINATION ¾-YARD SHOVEL — 35' clamshell boom, including ¾-yard Williams clamshell bucket. Located near Oshkosh, Wisconsin. Good condition. Priced to sell. Box 659-SS.

KOEHRING MODEL 601 SHOVEL. Cat mounted. 24' boom, 18' dipper handle, 1½ cubic yard manganese front dipper. 20" Cat treads. Wisconsin 6-cylinder Model E, 6"x7" gasoline engine. Located Maryland. Box 631-SS

TWO KOEHRING MODEL 502 COMBINATION SHOVELS AND CRANES. Each equipped 21' boom, 16' dipper handle, 1¼ cubic yard dipper, 50' crane boom with 10' removable insert. Kohler light plant driven by 4-cylinder gasoline engine. Excellent condition. Only handled one job. Shovel equipment has seen very little service. Located Philadelphia. Box 632-SS

LIMA 101 GASOLINE 1¼ YARD SHOVEL. Located eastern Pennsylvania. Good operating condition. Price reasonable. Box 576-SS.

MARION MODEL 450—1¼ YARD SHOVEL. AC-DC power. For 60 cycle, 3 phase, 440 volt current. Located eastern Pennsylvania. Price reasonable. Box 577-SS.

GENERAL COMBINATION SHOVEL-CRANE. Shovel Boom and Handle rebuilt. A-1 shape. ⅝ yard Dipper. 35' Crane Boom. 12 New Cat Tread Links. Cat mounting and general condition machine—good. Located Georgia. Price very reasonable. Box 578-SS.

NORTHWEST MODEL 105—1 YARD GASOLINE SHOVEL. Fair running order. Located Georgia. Bargain price. Box 579-SS.

1—Type B Bucyrus-Erie Combination High Lift Shovel and 40' Clamshell Machine.
1—Type B Bucyrus-Erie High Lift Shovel.
2—Type B-2 Bucyrus-Erie High Lift Shovels.
All located western Connecticut. Operating condition. Entire lot very low price. Box 573-SS.

2 INSLEY ¾ YARD GASOLINE SHOVELS. Located eastern New York State. Bargain prices. Box 574-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

MARION 1 YARD STEAM SHOVEL
Box 575-SS.

TWO 1030 single motor ELECTRIC SHOVELS. 12'10" boom, 10'6" dipper handle, 1 yard rock dipper: also 40' boom crane equipment, 7'6" rear end clearance. Electric power supply 3 phase, 60 cycle, 440 volt. Located Philadelphia. Very good condition. Box 626-SS

42-B STEAM SHOVEL—cat mounted. 21' boom, 15' dipper handle, two dippers—one 1½ cubic yard Vanderhoef dipper. Power boom hoist. Good condition. Located Rhode Island. Box 627-SS

⅝ YARD SHOVEL

Universal ⅝ yard gasoline shovel—¾ swing. Good operating condition. Located Northern Michigan. Box 636-SS

TYPE "AA" AIR TUNNEL SHOVEL equipped with 9'3" Caterpillar, 9'6" boom, 8' dipper handle and ⅝ cubic yard plate dipper with Panama teeth. Located, New York. Box 620-SS

B-2 STEAM SHOVEL, CAT MOUNTED. 19'9" boom, 16' dipper handle, 1 cubic yard dipper. Good running condition. Located, Minnesota. boom, 14' dipper handle, ¾ cubic yard dipper, also 36' clamshell boom and front drum and gearing. Located Kansas City, Missouri. Box 622-SS

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

TYPE "R" INSLEY SHOVEL ½ yard capacity—full revolving. Cat mounted—4-cylinder Buda gasoline engine, 45 HP. First class mechanical condition. Ready to go to work. Very favorable price. Located Milwaukee. Box 629-SS

COMBINATION SHOVEL-DRAGLINE-CLAMSHELL
Northwest Model 3 Combination Shovel—Dragline and Clamshell, without buckets. Shovel equipment 22'6" boom, 15'4" dipper handle, ¾ cubic yard dipper. Equipped with Wisconsin B-2 4-cylinder 5¼"x6½" gasoline engine. Completely overhauled July, 1934. Excellent condition. Box 635-SS

Small Clamshells and Cranes
Under 2 Yards

CRANE—THEW—UNIVERSAL—MODEL 35—25' boom clamshell—crane including ½ cu. yd. Williams clamshell bucket—center drive cat. Electric starter, 4 cylinder Waukesha 4½"x 6¼" gasoline engine. Also, complete ½ yd. shovel equipment, drag shovel equipment and skimmer scoop equipment together with home-made trailer. Box 468-SCC.

NORTHWEST — MODEL 105 — 45' BOOM CRANE. Cat mounted, 1 yd. capacity. 6¼x8 Twin City gasoline engine. Good operating condition. Located vicinity New York. Box 469-SCC.

BYERS BEARCAT 25' BOOM CLAMSHELL (¾ swing) and ½ cu. yd. Clamshell Bucket, including Trench digging attachment carrying ½ cu. yd. dipper, 24" wide over cutters—will dig maximum 15'. Good operating condition. Very attractively priced. Located vicinity of Wilkes Barre, Pennsylvania. Box 494-SCC.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wis.

NORTHWEST MODEL 105 Gasoline—40' boom clamshell. Good operating condition. Located Iowa. Box 516-SCC.

BUCYRUS-ERIE 1030 GASOLINE 40' BOOM CLAMSHELL MACHINE. Cat mounted. No Bucket. Recently overhauled. Guaranteed. Located Kansas City. Box 543-SCC.

KOHERING NO. 2 GASOLINE CRANES. 45' booms, 15 tons at 12' radius. Wisconsin engines. Recently overhauled. First class working condition. Located Milwaukee. Box 630-SCC

BARGAIN CRANE
Northwest Crane, Model 104, 40' boom. Manufacturer's No. 1446, Twin City Motor. Located in Texas. Box 642-SCC.

LINK-BELT COMBINATION CLAMSHELL DRAGLINE—SHOVEL—1½ cubic yard capacity. 22' shovel boom, 16'6" dipper handle, 1½ cubic yard Esco dipper. 40' clamshell-dragline boom and 1 cubic yard Blaw Knox No. 618 clamshell bucket and 1½ cubic yard Esco drag bucket. Powered with Atlas four cylinder 7"x10½" Diesel Engine. Good operating condition. Recently overhauled. Priced right. Box 650-SCC.

BAY CITY "PUP" CLAMSHELL MACHINE. Good operating condition. Box 514-SCC.

BYERS BEARCAT CLAMSHELL—Crane—30' boom. Will handle ½ cubic yard bucket. Located near Detroit. Box 648-SCC.

O & S MODEL "T" ⅜ yard clamshell machine. 40' boom. Good working condition. Powered with Climax 5½"x7" gasoline engine. Located southern Illinois. Good working condition. Box 651-SCC.

Small Draglines
Under 2 Yards

P&H MODEL 775—70' BOOM DRAGLINE including 1½ and 2 yard Omaha Buckets. Extra long Crawler. Excellent mechanical condition. No repairs needed. Located near Memphis. Box No. 489-SD.

THEW-LORAIN 75-A combination 1⅛ yard Shovel and 50' Boom Dragline including one yard Drag Bucket. Good condition. Located eastern Pennsylvania. Box 610-SD.

TWO P&H 700 DRAGLINES. 1½ cu. yd. buckets on 50' booms. Gas and Diesel. Located Lower Rio Grande Valley, Texas. Box 618-SD

P&H MODEL 206 GASOLINE DRAGLINE—¾-yd. capacity—40' boom—good operating and mechanical condition—overhauled during past winter. Located near Chicago. Box 668-SD.

LINK-BELT COMBINATION DRAGLINE—SHOVEL—CLAMSHELL—1½ cubic yard capacity. 22' shovel boom, 16'6" dipper handle, 1½ cubic yard Esco dipper. 40' clamshell-dragline boom and 1 cubic yard Blaw Knox No. 618 clamshell bucket and 1½ cubic yard Esco drag bucket. Powered with Atlas four cylinder 7"x10½" Diesel Engine. Good operating condition. Recently overhauled. Priced right. Box 650-SD.

Large Shovels and Draglines
2 Yards and Over

MARION MODEL 350 WARD-LEONARD ELECTRIC SHOVEL; 90' boom 55' dipper handle, 8 yd. dipper; truck mounted; for 3 phase, 60 cycle, 2300 volts; series motors; excellent condition; priced reasonably; location Northern Minnesota. Box 657-LSD.

BUCYRUS-ERIE 50-B DIESEL DRAGLINE AND CLAMSHELL. 50' boom. Will handle a 2 yard dragline bucket. Location New Jersey. Box 661-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price $3,000. Box 112-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable, reel and approximately 1400 feet of cable all in excellent condition. Reasonable price.
Address Box 268-LSD.

225-B SHOVEL, 6 and 7-yard dipper with caterpillars and track type equipment—in first-class condition. Located in northern Missouri. Box 452-LSD.

FOR SALE
CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars
ALSO
2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap. Box 419-LSD.

TYPE 175-B ELECTRIC, No. 794 equipped with 87' shovel boom, 48' dipper handle, 3½-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 263-LSD.

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper and sticks. Chicago territory. Box 347-LSD.

FOR SALE OR RENT
TWO CLASS 14 STEAM DRAGLINES, caterpillar mounted, equipped for burning gas or oil. Located, Southwest. Price approximately $4,000 each. Box 619-LSD.

100-B STEAM SHOVEL, 3 yd. dipper, location Eastern Canada. Immediately available. Used—good condition. Box 669-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 73-LSD.

50-B STEAM BUCYRUS-ERIE
COMBINATION SHOVEL AND DRAGLINE

26' Boom	1 KW 32 Volt Moon Electric Light Plant
17' Dipper Handle	
2 yard Dipper	Boiler—Standard coal burning locomotive type 54"x9'7"
50' Boom Dragline Equipment	

1¾ cubic yard Page Bucket

INCLUDING

2 steel under-frame flat cars on which machine now loaded. New 1929. Shop No. 10557. Moved only 260,000 yards material. Excellent condition. Deal direct with owner.

PRICE VERY ATTRACTIVE

Box No. 465 LSD.

MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

FOR SALE OR RENT
2-W Monighan Walking Dragline 65 foot boom, 2 yard bucket, 80 H.P. Fairbanks Morse Diesel engine. Used on three jobs. Excavated less than 200,000 yards. Present location on Mississippi River near Cairo. Accessible to barge. Can be demonstrated. Box 606-LSD.

BUCYRUS-ERIE 50-B DIESEL with Page Drag Shovel attachment—1½ yard—with side teeth to cut 5' wide and 20' deep. Also 50' boom, dragline and clamshell equipment; Delco Lighting plant. Location New Jersey. Box 660-LSD.

MARION MODEL 350 W. L. SHOVEL. New 1923, 90' boom, 56' handle, 6 yd. dipper, 3 phase, 60 cycle, 2300 volts, series motors. Has handled about 1,000,000 yds. stripping. Good condition. Price approximately $50,000.00 f.o.b. cars, Iron Range. Box 656-LSD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Locomotives

1 18-TON VULCAN LOCOMOTIVE No 387, 10x16 cyl., 36" gauge.

1 40-TON VULCAN LOCOMOTIVE No. 3295, 14.22 cylinders, link valve motion, standard gauge.

1 40-TON DAVENPORT LOCOMOTIVE No. 2189, new May 1931, 14x20 cylinders, link valve motion, standard gauge.

Box 100-L.

LOCOMOTIVES

6 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine. Box 152-ME.

For Sale or Rent

Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

Dump Cars

WANTED
20 Good used, Sanford-Day, Drop-Bottom Mine Cars, 42" gage, 3 or 4 ton capacity. 539-ME.

3 15-TON SANFORD-DAY DROP BOTTOM CARS, 36" gauge, link couplers.
6 40-TON SANFORD-DAY DROP BOTTOM CARS, without air brakes, standard railroad couplers, standard gauge.
2 12-YARD WESTERN, 2 WAY DUMP CARS, standard gauge.
3 6-YARD WESTERN, 2 WAY DUMP CARS, 36" gauge.
Box 100-DC.

Miscellaneous Equipment

TWO AMERICAN STEAM LOCOMOTIVE CRANES. Each 8 wheel—25 ton capacity. Each equipped with 8¼"x10" double cylinder engine. Boom 50'. Steam brakes and train air line. Boiler 54"x101" ASME—180 pounds pressure. Standard gauge 4'x8½". Used only eight months. Splendid condition. Box 628-ME

SHOVEL FRONT END for Bucyrus-Erie B-2 steam machine consisting of 19'9" new style heavy boom, 16' new style heavy dipper handle, and ¾ yard C.F.I.T. dipper. Box 584-SFE.

COMPLETE CONTRACTORS EQUIPMENT

Offered for sale by Southern contractor. Priced to sell.
7—Railroad Type Steam Shovels 2½ to 5 yd.
3—Full Revolving Shovels, ¾ yd.
1—Gasoline Clamshell Crane ½ yd.
2—Jordan Spreaders.
2—Locomotives, 26 Ton, American Saddle Tank.
32—12-yd. Western Heavy Duty Dump Cars.
3—Camp Cars.
1—Flat Car.
2—1-bag Gasoline Concrete Mixers.
Pumps, Boilers, Jacks and Other Tools.
For further particulars, Address
Box 138-ME.

4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $100.00 each. Chicago territory. Box 349-ME.

INDUSTRIAL BAY CITY 50' boom including 20' extension, 8-wheel steam locomotive crane. Steam turbine electric light plant. Capacity 45000 pounds at 12' radius. A-1 condition. Located Detroit. Box 655-ME.

WANTED
Shovel boom and dipper for Byers Master No. 3636, now equipped as Crane. Located at New York City. Box 641-ME.

EXCELLENT BUY
2 "Sixty" Caterpillar Tractors, 2 12-foot Blades. Located in Texas. Box 642-ME.

WANTED
Three 3-ton storage battery locomotives, 18, 20 or 24 gauge.
Forty 1-yard dump cars, preferably V-type side dump, same gauge as locomotives.
Give complete details including price in reply. Box 658-ME.

PARTS—175-B Shovel—PARTS

1 Main Engine
1 Boom
1 Dipper Shaft
1 Crowding Engine
1 Five Yard Dipper

If interested in making a good buy on these shovel parts, write us.
Box 607-ME.

TRACTORS AND WAGONS WANTED
A TEXAS CONTRACTOR wants 2 or 3 large oil-burning tractors and some 10 or 12 yard wagons. If decide to purchase, will want to inspect this equipment about June 10th. Give complete details and price in first letter. Box 667-ME.

CONTRACTORS EQUIPMENT
Priced to Sell

Spreader car	2 cu. yd. steam shovel	Power press	Drill steel sharpeners
Trailer, 30 ton	¾ cu. yd. steam shovel	Drill press	General and utility hoists
Tractors	Diesel shovel	Bulldozers	Gasoline locomotives
Track shifter	Dragline buckets	Dump Cars	Sectional metal powder magazine
Rock screen	Concrete mixer	Blowers	Misc. Timbers, 12x12x16
Boilers	Hand drill presses	Graders	¾ cu. yd. Air tunnel shovel

Compressors, 110, 160 & 220 cu. ft.
Stationary gas engine
Portable hand blower forges
Oil burner air furnace
Combination gasoline shovel

All excellent values at prices quoted. Location, New York, Massachusetts and Pennsylvania. Write for complete description, price and shipping point. Box 613-ME.

MECHANICS MATHEMATICS

GOOD NEWS! PRACTICAL MATHEMATICS ILLUSTRATED. EVERY MECHANIC can use the new correct easy methods covering a complete review of practical arithmetic, with examples, including mensuration—plane and solid geometry — trigonometry — algebra — calculus — ELECTRICAL AND MECHANICAL SHOP CALCULATIONS practical tests—reference tables and data how to use the slide rule—700 pages—580 illustrations—pocket size. Highly endorsed. Let us mail you copy for free trial. Price $2. postpaid.
Theo. Audel & Co., 65 West 23d St., New York

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June Advertisers

Athey Truss Wheel Co. 266
American Steel and Wire Company 269
Austin Western Road Machinery Co., The 291
Bargain Counter ..... 304 and 305
Bucyrus-Erie Co. ..... 271, 293, 294 and 4th Cover
Bucyrus-Monighan Company 265
Caterpillar Tractor Company ..... 2nd Cover
Chain Belt Company 301
Ensign-Bickford Company, The 295
For Sale Advertisements ..... 308 to 311
(See also pages 304 and 305)
Gatke Corporation 303
General Electric 268
Harnischfeger Corp. 303
Hayward Company, The 298
Hercules Powder Company 270
Ingersoll-Rand Company 297
Jahn Company, C. R. 298
Kochring Company 289
Koenig Labor Agencies, The 307
Leschen and Sons Rope Company, A. ..... 3rd Cover
Le Tourneau, R. G. Inc. 300
Loomis Machine Company, The 298
National Carbon Co., Inc. 301
Positions Wanted Advertisements 307
Sauerman Bro., Inc. 298
Shunk Mfg. Co. 307
Stulz-Sickles Company 296
Twin Disc Clutch Co. 299
Wellman Eng. Co., The 292
Westinghouse Electric & Mfg. Co. 299

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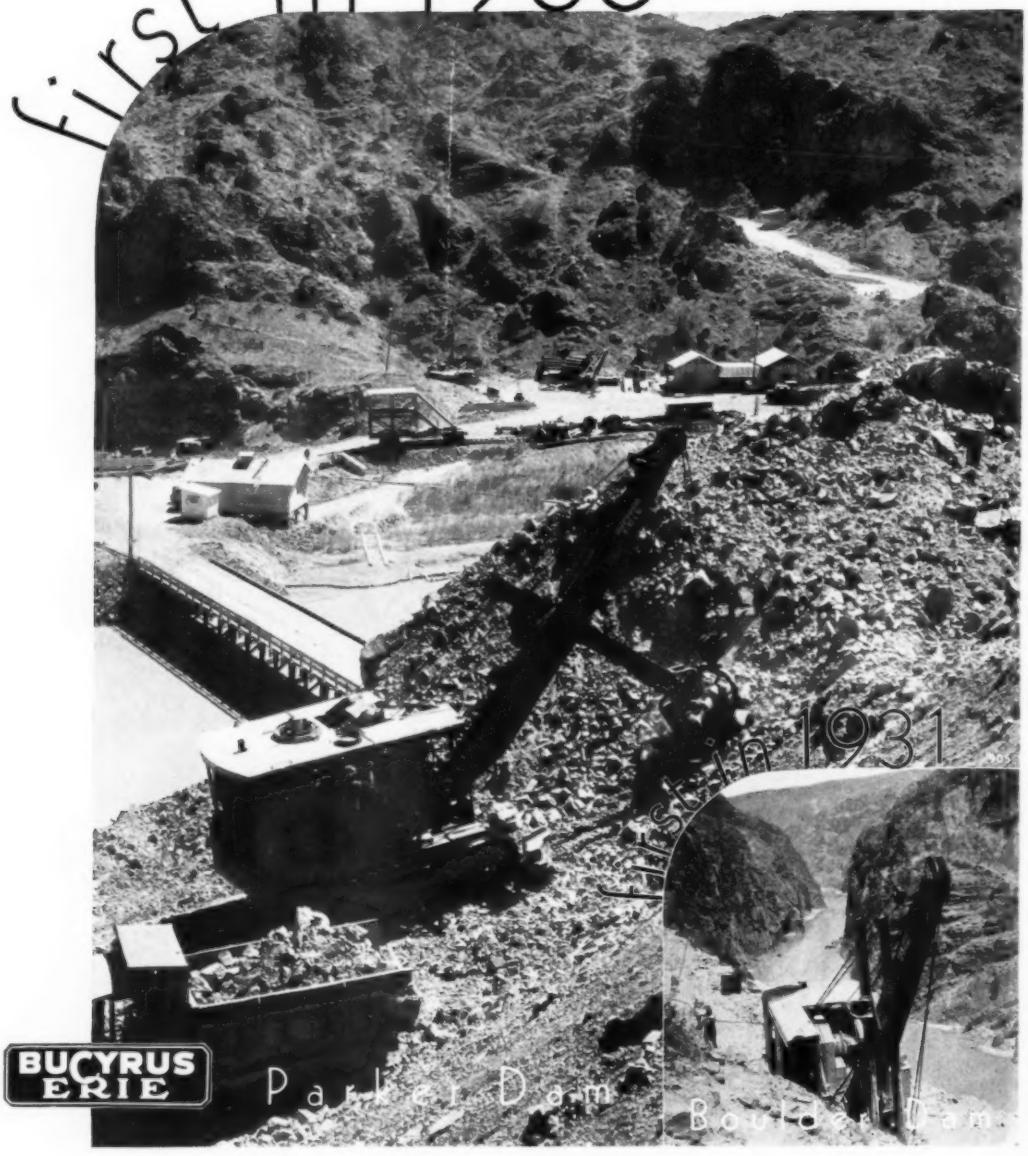

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